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Navy Career Sea Pay: Is it Still a Viable Compensating Wage Program? A Historical and Financial Analysis

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NAVY CAREER SEA PAY: IS IT STILL A VIABLE COMPENSATING WAGE PROGRAM? A HISTORICAL AND FINANCIAL ANALYSIS

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LIST OF ABBREVIATIONS AND ACRONYMS

ACOL	Annualized Cost of Leaving
AIP	Assignment Incentive Pay
BLS	Bureau of Labor Statistics
BM	Boatswain's Mate
CPI	Consumer Price Index
CPI-U	Consumer Price Index for All Urban Consumers
CSP	Career Sea Pay
CSPP	Career Sea Pay Premium
CTI	Cryptologic Technician Interpretive
CYS	Cumulative Years of Service
CYSD	Cumulative Years of Sea Duty
DFAS	Defense Finance and Accounting Service
DMDC	Defense Manpower Data Center
EAOS	End of Active Obligated Service Date
FC	Fire Controlman
MA	Master-at-Arms
MTP&E	Deputy Chief of Naval Operations (Manpower, Personnel, Training and Education)
NAVADMIN	Naval Administrative Message
NEC	Navy Enlisted Classification
NETPDTC	Naval Education and Training Professional Development and Technical Center
NPC	Naval Personnel Command
OS	Operations Specialist
OPNAVINST	Office of the Chief of Naval Operations Instruction
PST	Prescribed Sea Tour
SRB	Selective Reenlistment Bonus
UIC	Unit Identification Code

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I. INTRODUCTION

The United States armed forces' personnel system is unique among large organizations. A limited-entry system, personnel are promoted only from within and recruits from outside the organization enter at the lowest level. Such a structure allows for large turnover at the junior ranks, but it presents a challenge for manpower experts who must retain the more senior members who possess skills and leadership traits necessary to complete the military missions. The nature of these missions complicates the challenge. Often requiring members to be separated from their family and friends for long deployments in less than ideal living conditions and to work long hours in strenuous environments, these missions impose both a physical and mental cost on the members.

When deciding to remain in the military, a member must measure the magnitude of this cost and weigh it against the benefits received from serving. The difference in the costs and benefits is the value the member assigns to his or her service. The member then performs an analysis of the perceived costs and benefits of alternative employment opportunities and assigns each alternative a value. If the value of serving is greater than the alternatives, the member remains in the service; if not, the member separates. It has been suggested that the flat structure of the basic military pay system, with its relatively small increase in salary between pay grades, impedes the services' ability to create a competitive cost-benefit ratio. As a result, the services, and the Navy in particular, resort to various monetary and non-pecuniary benefits in the form of special pays, bonuses, and quality-of-life initiatives to create a better value proposition for members deciding whether to stay in the service. In the Navy, many of the key missions involve sea duty; the additional benefit offered to compensate for it and encourage it is Career Sea Pay (CSP) and Career Sea Pay Premium (CSPP). While CSP and CSPP exist in both the officer and the enlisted ranks, this project focused its scope on the enlisted community (which accounts for most of the CSP and CSPP expenditures).

The Navy has offered sea pay in one variety or another for almost as long as the institution has been in existence. Regardless of the manner in which the sea pay program

has been structured, its goal has been to recompense Sailors for hardships experienced at sea. Initially, CSP was funded by reducing the basic pay of Sailors' when they took a shore assignment; now, the pay is an additional remuneration structured similar to base pay. CSP was initiated in the early 1980's, and since that time it has been increased only twice. Until late 2001, CSP was offered while the Navy was primarily conducting peacetime operations. For Sailors, this period meant regular deployments that could be planned for with the guarantee of port calls that allowed for a break from the rigors of life at sea. Such circumstances reduced the perceived cost of sea duty. For Navy financial managers, the relatively small size of the CSP program when compared to other personnel pays gave them little cause to consider if the program was cost-effective. With the defense buildup in the Cold War 1980's and the manpower reduction instated as part of the "peace dividend" of the 1990's, CSP was not an important issue.

The terrorist attacks of September 11, 2001, and the subsequent Global War on Terrorism forced all programs under the microscope. The increasing frequency and irregularity of deployments to combat theaters of operation coincided with an effort by the Navy to make the service more sea-centric. The opportunities for active duty Sailors to serve in shore assignments decreased as those jobs were converted to civilian positions in an attempt to reduce personnel costs. These simultaneous events present a potential difficulty for long-term willingness to perform sea duty and remain in the Navy as they increase the cost of service faced by individual members.

Knowing that the benefits of a public policy program should outweigh its cost, financial managers at the Office of Financial Management and Budget in the Office of the Assistant Secretary of the Navy (Financial Management and Comptroller) expressed concern about the effectiveness of the CSP program. With an increase in the CSP rates enacted just prior to September 11, 2001, has the extra cost of CSP adequately compensated for the changes in sea duty associated with the Global War on Terrorism and met the needs of the force?

In the following chapters, this project's authors endeavor to answer that question. Chapter II provides a context for the CSP program as a part of the overall military compensation system. It first examines the advantages and disadvantages of the general

military compensation system's structure to provide incentive necessary to adequately man the force. The chapter then explores the efficacy of compensating wages such as CSP in influencing retention decisions. Next, previous studies relating specifically to CSP are reviewed. Finally, the history of the CSP program is presented to demonstrate the original intent of the program and the methods implemented to accomplish those goals.

Chapter III presents data available to measure both the costs the Navy incurs to keep people at sea and the benefits obtained. These data focus on a representative sample by using individuals from five Navy ratings. These ratings vary both in skill level required and the amount of time during a career typically spent at sea. Three ratings are considered sea-intensive: Boatswain Mate (BM), Fire Controlman (FC), and Operations Specialist (OS). Two are considered shore-intensive: Cryptologic Technician Interpretive (CTI) and Master-at Arms (MA).

Chapter IV explains the methodology employed to conduct empirical and statistical assessments of the cost-effectiveness of the CSP program. Chapter V presents the results of that analysis. Chapter VI communicates the conclusions drawn from the results and analysis and provides recommendations to the Navy for improving the effectiveness of the CSP program as an incentive to willingly perform sea duty.

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II. BACKGROUND

A. CHAPTER OVERVIEW

The value of CSP as a contributor to overall military compensation has been studied intermittently since the program was formally codified by Congress in 1978. While statutorily classified as a special pay to compensate for the arduous nature of sea duty, it has also been described as a necessary force-shaping tool (Golding & McArver, 2002). Because of this dual nature, it is important to understand CSP in both contexts. Hence, this chapter will first examine four major areas: (a) theoretical analyses of the military compensation system, (b) theoretical and empirical studies on the presence and efficacy of compensating wage differentials, (c) retention models and factors that affect retention, and (d) empirical and behavioral studies on sea pay and its relationship to sea duty and retention. This broad review is necessary because of the unique nature of the military compensation system.

This chapter will conclude with a discussion of recent sea-shore rotation policy revisions and a review of the history behind the CSP program. Changes in sea-shore rotation directly impact the amount of sea duty enlisted personnel will perform over their career, which increases the importance of determining the effectiveness of CSP. Examining the history of CSP reveals both the underlying justifications for establishing the program and how it has evolved over the past 170 years. Appendix A provides a legislative history of the CSP program.

B. THE MILITARY COMPENSATION SYSTEM

The military compensation system is unique among large, hierarchical organizations. Asch and Warner (2001) note three specific features – the relatively small difference in pay between ranks, a pension available only after a predetermined time of service, and the requirement to leave the organization if not promoted – that differ from the compensation plan of most large civilian companies. The latter characteristic also differentiates the military from federal civil service. Rosen (1992, p. 236) suggests that

these features make the compensation system "better suited to armed services based on conscription and tradition rather than on the voluntary professional army we have at present." This conclusion is a result of the allocation, productivity, and incentive problems that such a system can create for personnel and finance managers in the military.

Under conscription, wages were less important as an allocation tool since personnel could be easily replaced. Janowitz (1960) points out that special pays were determined by custom and tradition more than by a need to retain personnel in certain critical activities (as cited in Rosen, 1992). The resulting wage compression promoted more teamwork and therefore more productivity, and many believe that this is still a valid principle (Rosen, 1992). While this may be true, wage compression does not effectively promote reenlistment. Numerous studies, both theoretical and empirical, have shown that future income promotes reenlistment since wage elasticity of supply in the military is greater than unity; thus the percentage change in quantity of labor supplied is greater than the percentage change in wages provided by advancement (Warner & Goldberg, 1984; Daula & Moffitt, 1995; Griffis & Golding, 1997). Consequently, bonuses, special pays, and incentive pays in the military are used increasingly to overcome the problems the basic pay structure presents. CSP is a special pay the military uses to augment basic pay for those performing sea duty. This pay should serve some benefit in allocating personnel; however, since it is structured like basic pay with increases due to rank and years of service at sea, Rosen's analysis suggests that it may not be effective unless there is significant skewing of wages between pay levels.

Skewed wages at different levels of rank are also important in hierarchical organizations such as the military because influence increases with rank. At each successive level, the span of control and responsibility increases significantly (Rosen, 1992). The implication is that it is economically optimal to assign those with the most ability to top positions (Asch & Warner, 2001). The increasing marginal product of good performance at each rank indicates that the marginal wage at each rank should similarly increase (Rosen, 1992; Asch & Warner, 2001).

Since the military is perhaps the largest hierarchical organization in the United States and the span of control at upper levels is therefore larger, the pay scale would be expected to be more skewed than that in a civilian organization, but it is not. Bureaucrats and legislators seeking to change any part of the compensation system, including CSP, must be aware of the flat nature of the military pay scale. To the extent that changing the structure of CSP increases the difference in pay between ranks, CSP serves to better reward the increase in productivity generated by those serving competently in the higher ranks. Conversely, changes that lessen the skew in wages or create an inversion impair ability to retain and promote the most talented personnel and decrease the productivity of the entire force.

Compensation structure also plays a primary role in determining the shape of the military force. Any person deciding whether or not to remain in the service considers costs and benefits. The benefit to remaining is primarily the income that person can expect to receive (both while in the service and after retirement), although other benefits are also present, e. g. free health care and intangibles such as power and status (Rosen, 1992). Part of this expected income consists of the increase in wages that results from a promotion. Given that there is no lateral entry into the military structure and promotions occur from within, receiving one promotion makes a person eligible for others (Rosen, 1992; Asch & Warner, 2001). Since there are fewer available positions at each successive level in the hierarchy, a competition ensues and promotion opportunity decreases at each level (Rosen, 1992). Those desiring to pursue a career must increase their effort to remain competitive for promotions since the quality of personnel presumably rises at each level.

The benefit calculation to encourage this effort is the weighted sum of all rewards obtained at all future potential ranks, with the weights being the probability of promotion (Rosen, 1992). Rosen therefore determines that the proportional increase in salary at each rank level must be greater than the proportional decrease in promotion probability to ensure the process remains competitive and retains the correct personnel. He also concludes that the military pay structure remains flat despite this determination; a large

rank difference in salary can produce lack of cohesiveness and cooperation detrimental to the successful operation of the organization (Rosen, 1992).

Asch and Warner (2001) develop a model to explain military compensation policy by measuring effort, ability, wages, promotion probability, and preference for serving. They confirm Rosen's analysis that increasing the skew of the pay system improves these variables, but not significantly. They offer three reasons that facilitate the military in maintaining a flat pay structure between ranks: lateral entry requires a higher initial starting salary to attract recruits, the force structure is bottom heavy allowing for more turnover in the junior ranks, and a heterogeneity of preferences that promotes more sorting on preferences and increased retention at higher ranks (Asch & Warner, 2001). From this analysis, it appears that skewing wages for junior personnel may increase their retention since sorting based on preferences has yet to occur. The pay scale can flatten as seniority increases since the value of the military pension becomes a more significant factor in whether to remain in the military.

Career Sea Pay is a part of the overall military compensation system. The studies above focus on compensation as a means to encourage effort and productivity, otherwise known as an efficiency wage. However, CSP is often regarded as a compensating wage since it is designed to provide a monetary reward for performing arduous duty (Rosen, 1992; Fairris & Alston, 1994; Asch & Warner, 2001). The following section discusses compensating wages and their relationship to efficiency wages.

C. COMPENSATING WAGE DIFFERENTIALS

1. Theory

Adam Smith wrote that the "agreeableness or disagreeableness of the employments themselves" is one of five principles that explain monetary wage differences between jobs (1793/1981, p. 116). Disagreeable jobs must command higher wages to offset the disadvantages inherent in the nature of the work. Otherwise, economic equilibrium in the labor market would never be established as no one would be willing to perform the disagreeable task without a differential wage. Compensating

wages are present in labor markets to equalize overall compensation among identical workers with diverse work environments (Fairris & Alston, 1994). This theory of compensating wages, proposed over 200 years ago, has not been tested empirically until recently. These studies attempt to identify if compensating wages are actually paid and if so, for what job characteristics.

2. Empirical Evidence

While the theory of compensating wage differentials has been generally accepted and further developed since the time of Adam Smith, there have been difficulties in applying the theory in real-world settings. Robert Smith (1979) notes that labor markets and their relevant supply and demand curves are made up of many dimensions. It is therefore problematic to analyze single characteristics such as the unpleasantness of the work to be performed. Thus, "the fact that [researchers] cannot in general estimate underlying demand or supply functions for job characteristics limits the usefulness of compensating differentials for policy purposes" (R. Smith, 1979, 341). Fairris and Alston (1994, p. 149) amplify that concern, and state that the "distinction between efficiency wages and compensating payments is, at best, rather vague in…literatures positing a relationship between wages and the intensity of labor effort." They conclude that determining this relationship requires developing a model that distinguishes between the two types of compensation and simultaneously measures the presence of each (Fairris & Alston, 1994). Using such a model and survey data from the *1977 Quality of Employment Survey*, they conclude that compensating wage differentials are not received by workers who perform more strenuous work; instead, any pay differences are efficiency wages (Fairris & Alston, 1994).

The above result suggests that if compensating payments are not present, they are not required by potential employees. If true, this would have a profound impact on the use of special pays such as CSP that are designed to provide compensating differentials. The result is similar to those of many studies performed in the 1970s exploring the presence and extent of compensating differentials for various job characteristics. A review of over 15 studies indicates the only negative job characteristic for which

employers provide a significantly positive compensating wage is risk of death (R. Smith, 1979). The presence of other negative characteristics such as job insecurity and hard or stressful work provides no clear support for compensating wage differential theory (R. Smith, 1979). Robert Smith (1979) believes that each of the studies has some deficiency such as the type of data analyzed or the model utilized. For example, self-reported data (such as those used by Fairris and Alston (1994)) may exhibit selection biases due to the background and level of risk aversion of the respondents (R. Smith, 1979).

The results of these studies indicate that attempting to determine wages required to compensate for the negative aspects of sea duty can be difficult. Yet, one negative aspect of sea duty may be easy to measure: hours worked. The Chief of Naval Operations (2002) acknowledged that there is an expectation that personnel at sea will work longer hours. As defined by the Navy Standard Workweek, Sailors are nominally expected to work 81 hours per week while underway, of which 70 (exclusive of time for training and administrative requirements) are productive (Chief of Naval Operations, 2002). Surveys conducted that asked Sailors to report their hours worked while underway have shown that these numbers are fairly accurate (Golding *et al.,* 2001).

This places Navy personnel at sea in a position experienced by only a small percentage of their civilian counterparts. Table 1 shows the percentage of the civilian employed workforce who reported working either 40 hours or less per week or more than 60 hours per week as derived from the December 2006 Current Population Survey conducted by the United States Bureau of Labor Statistics. Clearly, Navy personnel are expected to work much more when at sea than similarly qualified civilians. The likely fatigue induced by this longer workweek is magnified by the impact of rotating watches and the requirement to respond to unannounced drills or casualties. Golding *et al.* (2001) found that those sailors who reported working more than 70 hours per week are 10 percent more likely to be lost by attrition during their sea tour than those who report working less than 70 hours per week.

In port, the Chief of Naval Operations (2002) expected Sailors to work a standard 40-hour week, of which 33.38 hours (exclusive of training, administrative requirements, leave, and holidays) are productive. Thus, by using Navy Standard Workweek values, it

should be feasible to measure the effectiveness of CSP based on an ability to compensate for the additional hours worked at sea. For more intangible factors, however, the effectiveness of CSP may be better measured by examining its effect on retention. The following section examines some of the major factors affecting retention and the models used to explain them.

	Percentage	
Hours of Work	Males	Females
40 or Less	62.69%	79.15%
60 or Greater	11.90%	4.25%

Table 1. Typical Hours of Work in a Week, Civilian Sector. (From United States Census Bureau, 2006)

D. RETENTION MODELS AND FACTORS AFFECTING RETENTION

1. Retention Models

When a person decides whether to reenlist there are a number of factors that the individual considers. These factors include future wages, marriage status, geographic location, age, education, race, and time at sea (Warner & Goldberg, 1984; Brown, 1985; Schiller *et al.*, 1991; Rosen, 1992; Asch & Warner, 2001; Carrell & West, 2005; Huang *et al.*, 2006). The likelihood of earning more money by leaving the military is a key determinant in any retention decision. Accurately calculating the true value of this opportunity cost by predicting the effects of the factors above has been an ongoing challenge for economists. The calculation process is such that if the "present value of the returns associated with [leaving] exceeds both the monetary and psychological costs of leaving, workers will be motivated to change jobs" (Huang *et al.*, 2006, p. 492). Psychological costs include non-pecuniary aspects of leaving such as the stress an individual may experience while searching for a new job and transitioning to a new work environment.

Warner and Goldberg (1984) propose the Annualized Cost of Leaving (ACOL) model for reenlistment decisions. This model has come to be the "most well-known

model in the military retention literature" (Daula & Moffitt, 1995, p. 507). In this model, the cost of leaving is the difference between the present value of the income stream staying in *n* more years and then leaving and the income stream from leaving immediately; therefore, an "individual prefers a strategy of remaining in the military for *n* more years to one of leaving immediately only if the ACOL exceeds the net taste for civilian life" (Warner & Goldberg, 1984, p. 27). The model's strengths are that it determines the optimal value for the ACOL that is used for comparison to the net preference for civilian life and it is relatively simple to calculate (Daula & Moffitt, 1995). However, Daula & Moffitt assert that the model is weak because it does not account for changes in the future leaving date and assumes that individuals ignore the possibility of future changes in compensation (no error factor).

To alleviate these concerns, Daula and Moffitt (1995) proposed a new retention model based on dynamic programming. While specific discussion of the model's formulation is beyond the scope of this review, the salient difference between this model and the ACOL model is incorporation of heterogeneous preferences. This heterogeneity was noted by Asch and Warner (2001) above as a reason for the flatness of the compensation structure of the military. Daula and Moffitt (1995, p. 505) account for the heterogeneity by "introducing a conventional random effect that differs across individuals but which is constant over time." Despite this criticism of the ACOL model, Daula and Moffitt (1995) concede that the ACOL and their model produce similar results when immediate changes in compensation occur. However, when changes in compensation to be made in the future are incorporated to model current reenlistment decisions, they conclude their model yields more plausible predictions (Daula & Moffit, 1995).

Goldberg (2001) performs a thorough analysis of both models. While acknowledging the ACOL model's use of a single, dominant horizon, Goldberg (2001) points out that the model's creators always intended that the model be recalculated for any change in future compensation. Additionally, the assertion made by Daula and Moffitt (1995) that their model does not take significantly longer to generate results than the ACOL model is shown to be false. One model run takes, by the creators' admission, over 48 hours of computer time (Goldberg, 2001). Therefore, the arguments made by

Daula and Moffitt (1995) do not invalidate the ACOL model; rather the term "optimal horizon" should not be used to describe the future period used by the ACOL model to derive its results (Goldberg, 2001, p. 76).

Each of the above (and similar) models incorporate the non-pecuniary factors mentioned above and measure their effect on retention. The remainder of this section discusses three other factors that CSP can possibly influence as an individual makes a decision to remain in the military: future earnings, marriage status, and geographic location. Studies on sea duty effects and CSP will be considered in the next section.

2. Future Civilian Earnings

The most difficult factors to value are non-pecuniary. Salary values are readily available. As discussed above, numerous studies find that the military-civilian pay difference has a significant impact on retention since the military pay elasticity is greater than unity (Warner & Goldberg, 1984; Daula & Moffitt, 1995; Asch & Warner, 2001). These results are similar to studies done in civilian organizations that found longer retention when pay is higher than that offered externally or when pay is higher than that of their peers (Huang *et al.*, 2006). While the latter scenario is rare in the military, the former scenario provides evidence that military members act similarly to their civilian counterparts.

One study finds that wages offered in the civilian sector, or opportunity wages, have come to have a reduced effect on the reenlistment decision (Schiller *et al.*, 1991). Using longitudinal data tracking the post-military employment history of Navy veterans, the study determines that opportunity wages do not have a significant impact on retention (Schiller *et al.*, 1991). Rather than disprove the theory supported by the evidence above, they believe that it supports it. They conclude that the Navy effectively uses reenlistment bonuses to minimize the military-civilian wage differential (Schiller *et al.*, 1991). Based on these results, one would expect any increase in military compensation to have a positive effect on retention; however, since the amount of CSP compared to overall compensation is small, it is likely that retirement benefits and bonuses are more effective

at overcoming differentials with civilian pay. Hence, a more narrow focus on the direct effect of CSP on sea duty is likely a more useful plan of study.

3. Marital Status

Marital status is another factor that is often studied in relation to retention. Unlike military-civilian wage differences, however, the results are mixed. A number of studies conclude that married military personnel reenlist at higher rates than their single peers because of the lure of non-pecuniary benefits including health care and access to commissaries (Warner & Goldberg, 1984; Daula & Moffitt, 1995). These conclusions are similar to studies done in the civilian sector that show marriage to be significantly and positively related to retention length (Huang *et al.*, 2006). Conversely, a study using longitudinal data found that married personnel are less inclined to reenlist in the Navy, presumably because of long absences while at sea (Schiller *et al.*, 1991).

The conflicting findings present an issue of interest for those studying the effectiveness of CSP. If separation from family while at sea is a factor that should be compensated for, should CSP have different pay tables for those with and without dependents like the Basic Allowance for Housing? Are non-pecuniary benefits enough to encourage retention? Williams (2006) argues that cash payments are more tangible and allow members to better evaluate and compare their total compensation with civilian pay.

4. Geography

The relationship between geographic location and reenlistment does not intuitively appear to be significant. But recent studies find it is a concern when considering military compensation in general, and CSP, specifically. The impact of geography on enlistment decisions has been studied for some time. Brown (1985) suggests that the decision to enlist will vary by region due to both a cultural propensity for military service in some areas and a non-uniform unemployment rate throughout the country. He finds that the ratio of military to civilian pay by state to be a significant factor in explaining military enlistments by state (Brown, 1985). If high unemployment

rates encourage enlistment, some posit that bases located in high demand or high cost locations will have lower reenlistment rates.

Carrell and West (2005) state that the military compensation system is inefficient because it does not vary basic pay based on the geographic location where a member is stationed like most civilian organizations. Consequently, the military-civilian pay ratio in those areas is reduced, and retention lowers at those bases since the preference for the military in favor of civilian life is not compensated as well. To correct this, they suggest modifying the wage system so that there are exactly enough volunteers for each location (Carrell & West, 2005). While they prefer changes to the basic pay tables to achieve their objective, they acknowledge that auction systems such as the Navy's Assignment Incentive Pay (AIP) Program have been effective at efficiently and effectively sorting personnel at low-demand duty stations (Carrell & West, 2005).

Bub (2005) separately applies the logic of Carrell and West (2005) to sea duty assignment locations. Throughout the Navy, there are billets at a number of duty stations that are difficult to fill voluntarily because of amenities or location (Bub, 2005). The effect of involuntary assignment is a reduction in retention and an increase in retention bonuses required to maintain force levels at those locations. Noting the success of the AIP program, Bub (2005) proposes allowing Navy enlisted personnel to bid on their CSP rate so that every billet is voluntarily filled. This plan would increase the effectiveness and efficiency of the CSP program, generating millions of dollars in savings from unneeded retention bonuses to maintain manning levels for billets involuntarily assigned in the current system (Bub, 2005). The next section reviews those studies that investigate the effect of CSP changes on retention and willingness to go to sea.

E. SEA PAY STUDIES

1. Early Studies

Numerous studies that examine the effects of sea pay on retention through reenlistment or extension were conducted in the first half of the 1980s. They studies also investigate the relationship between sea duty and sea pay. Solnick (1988, p. 2) notes that

"sea duty is an effect that cannot be divorced from any study on the impacts of sea pay." Kleinman (1983) concludes that changes in sea pay have a positive correlation with sea duty changes but have less impact on total man-years served than using reenlistment bonuses (as cited in Solnick, 1988). This is because sea duty has a negative effect on reenlistments while sea pay encourages extensions (Solnick, 1988). Warner and Goldberg (1984), in their paper that derives the ACOL model, use the model to test their hypothesis that the incidence of sea duty has an inverse effect on retention rates. Their analysis shows that those specialties with a higher incidence of sea duty have lower wage elasticities and reenlist at lower rates at the first decision point than those specialties with lower sea duty rates (Warner & Goldberg, 1984). Additional studies by Radke (1984) and Goldberg (1985) suggest that increasing sea pay may increase extensions at the expense of reenlistments (as cited in Solnick, 1988).

In a thorough analysis of these early studies, Solnick (1988) finds that researchers did include sea duty in their attempt to find the effect of sea pay; however, data limitations and modeling choices provide inconsistent results that often lack statistical significance. While he identifies seven conditions that must exist to effectively determine the effect of sea pay on reenlistments and extensions, only three are of interest in our research. First, the interaction between reenlistments and extensions must be considered jointly and sea pay must be allowed to have different effects on each (Solnick, 1988). In many studies, the decision is modeled simply as stay-or-go, with no attempt to model an extend-reenlist type decision. This ignores the relationship between extending and reenlisting. If those who extend are more likely to reenlist and if sea pay encourages more extensions, one could conclude that sea pay also has a positive effect on reenlistments (Solnick, 1988). Goldberg (2001) cites this limitation and concludes that it still exists thirteen years later as models that can accurately account for this possibility are still unwieldy and rarely used.

The second issue that Solnick (1988) identifies is considering the effect of sea pay on sea duty independent of retention effects. That analysis would determine if sea pay is encouraging additional sea duty by compensating for its unpleasant aspects. Studies of this type have been performed recently and are discussed below. The final issue is self-

selection into sea-intensive ratings that lead to biases in data if personal taste for sea duty is ignored when grouping data by occupational area (Solnick, 1988). Thus, the effect of sea pay on retention will likely differ among occupational groups (Solnick, 1988). To account for this bias, aggregation of data should be minimized whenever possible and individual responses from sources such as the annual Quality of Life Survey should be used (Solnick, 1988). To avoid these concerns and address these issues, most of the recent studies on CSP and its effects have been behavioral and use less modeling.

2. Recent Studies

The study of sea pay and its effects on sea duty and retention did not reemerge as a significant topic until the late 1990s. The Navy was reducing end strength and converting military-filled shore billets to civilian-filled billets while maintaining the same fleet, requiring the sea-shore rotation ratio to increase. An increase in the sea-shore rotation ratio leads to an increase in sea duty and a decrease in retention. The attempt by Navy leadership to address these concerns is described below. Griffis and Golding (1997) find that a reduction in 5,000 shore billets decreases Zone 'A' retention by 1 percent and Zone 'B' retention by 0.7 percent, requiring 59 million dollars in retention bonuses to offset. Since "economic theory says that the more narrowly the compensation is targeted, the more cost effective it will be," the studies in this time period examine ways to change CSP and how those changes affect Sailors' willingness to go to sea (Griffis and Golding, 1997, p. 3).

A comprehensive study by Golding and Griffis (1998) examines three options to improve sea-shore balance, readiness, and retention: accelerating the phase-in of sea pay increases to target first-term retention, increasing the CSP premium, and a combination of the first two options. These options are compared to an across the board raise in CSP rates to account for inflationary losses. Between 1988 and 1998, CSP lost 88 million dollars in value, or 40 percent of its purchasing power, due to inflation (Golding and Griffis, 1998). Each of the proposals cost an amount equal to the value CSP lost from inflation and each is designed to prevent pay inversions. Theoretically, increasing sea pay at the first reenlistment point (3-4 years of service) will compensate some Sailors for

the additional hardship of sea duty, and they will reenlist or extend (Golding and Griffis, 1998). The only question is whether an accelerated phase-in of changes to the CSP table or an increase in the CSP premium is more effective.

Using the ACOL model to predict the effects of each proposal, Golding and Griffis (1998) recommend the accelerated phase-in option. This recommendation is made more on the predicted increase in retention than on the predicted increase in man-years of sea duty. Increasing the CSP premium encourages extensions of sea duty and generates more total man-years of sea duty. Accelerated phase-in creates 9,113 additional man-years of sea duty compared to 9,493 for a CSP premium increase, 7,712 for the combination option, and 2,608 for the across-the-board inflation correction (Golding and Griffis, 1998). An accelerated phase-in of 130 dollars per month increases first-term reenlistments by 0.73 percent and second-term reenlistments by 0.36 percent compared to 0.48 percent and 0.51 percent for the inflation adjustment, respectively (Golding and Griffis, 1998).

Golding and Griffis (1998) do not recommend increasing the CSP premium because it does not provide the same increase in reenlistment as the accelerated phase-in of the CSP increase. As Golding and McArver (2002) explain, CSP is geared more towards careerists while the CSP premium is geared towards junior personnel near their first reenlistment point. This is because the CSP premium is paid only after three consecutive years of sea duty are completed. Increasing the CSP premium gained favor after the 1996 homebasing survey revealed 65 percent of Sailors would extend for 1 year and 22 percent for 3 years for an additional 150 dollars per month in sea pay (Griffis & Golding, 1997; Golding & McArver, 2002). Extensions can be effective since savings are realized from permanent change of station and training cost reductions. Griffis and Golding (1997) estimate the net savings of a CSP premium increase to be 182 to 196 million dollars. Griffis and Golding (1997) state that increasing the CSP premium is the most cost-effective solution to increasing the total amount of time Sailors spend on sea duty.

Despite these apparent contradictions, Golding and McArver (2002) find that any increase in sea pay is followed by a subsequent increase in voluntary extensions of sea

duty. Using projected rotation date extension request data, which Golding and McArver (2002, p. 15) note are "[the Navy's] only measure of voluntary behavior," extension requests increase significantly in the years immediately following an increase in CSP. The reenlistment benefits are less clear. The reenlistment figures calculated by Golding and Griffis (1998) for an accelerated phase-in CSP increase are half of what would be achieved if selective reenlistment bonuses in the same amount are offered (Golding & McArver, 2002). Thus, Golding and McArver (2002, p. 19) conclude that CSP is "an effective distribution tool and only secondarily a retention tool."

F. SEA-SHORE ROTATION

The Chief of Naval Personnel (2000), presumably cognizant of the implications of the studies described above, endeavored to reduce the length of sea tours for those in the career grades, E-5 to E-9. The stated goal was to limit tour lengths at sea in these grades to no more than 48 months. As shown in Table 2 and Table 3 below, this plan has been successful until recently. For both sea-intensive rates such as BM, FC, and OS and non-sea-intensive rates such as CTI and MA, these grades experienced reductions immediately following the declaration of the policy. In May 2006, the Chief of Naval Personnel (2006), citing a reduction in end strength combined with constant manning requirements, was forced to violate this previously stated policy, particularly in sea-intensive ratings at the E-5 grade. Table 2 and Table 3 also show that for those personnel in their first tours (E-4 and below), sea tour lengths have remained constant. Table 4 and Table 5 indicate that even as sea tour lengths have decreased, shore tour lengths for those in sea-intensive rates have remained constant or have decreased. This is due largely to the fact that over 19,700 enlisted shore billets have been either eliminated completely or filled by civilian employees since 2001 (Chief of Naval Personnel, 2006). As a result, the sea-shore ratio for sea-intensive rates remains well above one except for the most senior enlisted personnel.

Thus, despite the stated desire to minimize the time Sailors experience the negative aspects of sea duty, economic reality and technological constraints have limited the Navy's ability to fully implement its policy objectives. In response, the Navy

Personnel Command formed a sea-shore rotation working group to identify various personnel and financial strategies which will serve to either reduce the sea-shore ratio or compensate for the longer time at sea (Chief of Naval Personnel, 2006). The effects of sea-shore rotation and sea-tour length have implications for the cost-effectiveness of the current CSP program.

	1998-JAN 2000 (NAVADMIN 192/98)		FEB 2000-NOV 2001 (NAVADMIN 026/00)		DEC 2001-APR 2006 (NAVADMIN 341/01)		MAY 2006 - Present (NAVADMIN 130/06)	
Rate	Time at Sea (Months)	Time Ashore (Months)	Time at Sea (Months)	Time Ashore (Months)	Time at Sea (Months)	Time Ashore (Months)	Time at Sea (Months)	Time Ashore (Months)
BMCM	42	36	42	36	42	36	36	36
BMCS	48	36	42	36	42	36	36	36
BMC	48	36	42	36	42	36	42	36
BM1	48	36	42	36	42	36	42	36
BM2	48	36	48	36	48	36	54	36
BM3	60	36	60	36	60	36	60	24
BMSN	60	24	60	24	60	24	60	24
CTICM*	36	72	36	108	36	72	36	36
CTICS*	36	72	36	72	36	72	36	36
CTIC*	36	36	36	72	36	36	36	36
CTI1*	72	36	36	36	72	36	36	36
CTI2*	72	36	72	36	72	36	36	36
CTI3*	72	36	72	36	72	36	24	36
FCCM**	42/42	36/36	45/45	36/36	45/45	36/36	39/39	36/36
FCCS**	42/42	36/36	45/45	36/36	45/45	36/36	39/39	36/36
FCC**	36/36	36/36	36/36	36/36	42/42	36/36	39/39	36/36
FC1**	48/48	36/36	45/45	36/36	42/42	36/36	54/48	36/36
FC2**	48/48	36/36	48/48	36/36	45/42	36/36	60/60	36/36
FC3**	60/60	36/36	60/60	36/36	54/54	36/36	60/60	24/24
FCSN	60	24	60	24	54	24	60	24

* CTI does OCONUS shore/CONUS shore vice sea/shore

**(AEGIS/Non-AEGIS)

Table 2. Sea/Shore Rotation for Selected Rates from 1998 to Present

	1998-JAN 2000 (NAVADMIN 192/98)		FEB 2000-NOV 2001 (NAVADMIN 026/00)		DEC 2001-APR 2006 (NAVADMIN 341/01)		MAY 2006 - Present (NAVADMIN 130/06)	
Rate	Time at Sea (Months)	Time Ashore (Months)	Time at Sea (Months)	Time Ashore (Months)	Time at Sea (Months)	Time Ashore (Months)	Time at Sea (Months)	Time Ashore (Months)
MACM***	36	36	36	36	36	36	36	36
MACS***	36	36	36	36	36	36	36	36
MAC***	42	36	36	36	36	36	36	36
MA1***	48	36	42	36	36	36	36	36
MA2***	60	36	54	36	48	36	36	36
MA3***	60	36	60	36	54	36	42	36
OSCM	48	36	42	36	42	36	36	36
OSCS	48	36	48	36	48	36	36	36
OSC	48	36	48	36	48	36	48	36
OS1	48	36	48	36	48	36	48	36
OS2	54	36	54	36	54	36	54	36
OS3	60	36	60	36	60	36	60	24
OSSN	60	24	60	24	60	24	60	24

*** MA does OCONUS or Sea/CONUS shore

Table 3. Sea/Shore Rotation for Selected Rates from 1998 to Present

	1998-JAN 2000 (NAVADMIN 192/28)	FEB 2000-NOV 2001 (NAVADMIN 026/00)	DEC 2001-APR 2006 (NAVADMIN 341/01)	MAY 2006-Present (NAVADMIN 130/06)		
Rate	Sea/Shore Ratio	Sea/Shore Ratio	Sea/Shore Ratio	Sea/Shore Ratio	Increase From 1998 to Present?	Greater Than 1 (Non-Balanced)?
BMCM	1.17	1.17	1.17	1	NO	NO
BMCS	1.33	1.17	1.17	1	NO	NO
BMC	1.33	1.17	1.17	1.17	NO	YES
BM1	1.33	1.17	1.17	1.17	NO	YES
BM2	1.33	1.33	1.33	1.5	YES	YES
BM3	1.67	1.67	1.67	2.5	YES	YES
BMSN	2.5	2.5	2.5	2.5	NO	YES
CTICM*	0.5	0.33	0.5	1	YES	NO
CTICS*	0.5	0.5	0.5	1	YES	NO
CTIC*	1	0.5	1	1	NO	NO
CTI1*	2	1	2	1	NO	NO
CTI2*	2	2	2	1	NO	NO
CTI3*	2	2	2	0.67	NO	NO
FCCM**	1.17/1.17	1.25/1.25	1.25/1.25	1.08/1.08	NO/NO	YES/YES
FCCS**	1.17/1.17	1.25/1.25	1.25/1.25	1.08/1.08	NO/NO	YES/YES
FCC**	1/1	1/1	1.17/1.17	1.08/1.08	YES/YES	YES/YES
FC1**	1.33/1.33	1.25/1.25	1.17/1.17	1.5/1.33	YES/NO	YES/YES
FC2**	1.33/1.33	1.33/1.33	1.25/1.17	1.67/1.67	YES/YES	YES/YES
FC3**	1.67/1.67	1.67/1.67	1.5/1.5	2.5/2.5	YES/YES	YES/YES
FCSN	2.5	2.5	2.25	2.5	NO	YES

* CTI does OCONUS shore/CONUS shore vice sea/shore

**(AEGIS/Non-AEGIS)

Table 4. Sea/Shore Ratio for Selected Rates from 1998 to Present

	1998-JAN 2000 (NAVADMIN 192/28)	FEB 2000-NOV 2001 (NAVADMIN 026/00)	DEC 2001-APR 2006 (NAVADMIN 341/01)	MAY 2006-Present (NAVADMIN 130/06)		
Rate	Sea/Shore Ratio	Sea/Shore Ratio	Sea/Shore Ratio	Sea/Shore Ratio	Increase From 1998 to Present?	Greater Than 1 (Non-Balanced)?
MACM***	1	1	1	1	NO	NO
MACS***	1	1	1	1	NO	NO
MAC***	1.17	1	1	1	NO	NO
MA1***	1.33	1.17	1	1	NO	NO
MA2***	1.67	1.5	1.33	1	NO	NO
MA3***	1.67	1.67	1.5	1.17	NO	YES
OSCM	1.33	1.17	1.17	1	NO	NO
OSCS	1.33	1.33	1.33	1	NO	NO
OSC	1.33	1.33	1.33	1.33	NO	YES
OS1	1.33	1.33	1.33	1.33	NO	YES
OS2	1.5	1.5	1.5	1.5	NO	YES
OS3	1.67	1.67	1.67	2.5	YES	YES
OSSN	2.5	2.5	2.5	2.5	NO	YES

*** MA does OCONUS or Sea/CONUS shore

Table 5. Sea/Shore Ratio for Selected Rates from 1998 to Present

G. HISTORY

1. Early History

The earliest form of sea duty pay in the U.S. Navy dates back to 1835 and governed sea duty pay for Navy officers for almost 75 years. During this time sea duty pay was based on within-grade differentials linked to the duty status of the officer. These differentials, with service ashore earning reduced pay, were based on the then mindset that sea duty was the normal service of a Sailor and should receive regular pay rather than extra pay. Anyone who was not at sea was considered to be performing at less than their full duty; therefore, he was only entitled to only a fraction of the regular pay for his grade. Throughout the 1800's there continued to be a gradual evolution of the sea pay

structure. The Act of June 1, 1860, recognized the length of an officer's cumulative sea service as a pay factor in some officer grades while continuing the within-grade differentials linked to their operational status. This act also prescribed pay steps based on length of sea service for certain sea-intensive grades; however, these sea-service pay steps lasted only a few years (Department of Defense, 2005, p. 457). These initiatives, while short-lived, are not that dissimilar from the elements comprising the structure of the CSP program in place today.

More change occurred with the Act of May 13, 1908, which ended the duty status differentials and established pay rates for Navy officers that were based strictly on grade and length of service. With the establishment of these new pay rates for officers assigned to sea duty, sea pay would now be seen as extra compensation in addition to the officers' base pay. Thus, Navy leadership and Congress recognized the difficult nature of sea duty and restructured sea pay as a compensating wage for the additional hardship experienced by officers at sea. Officers became entitled to an additional ten percent of base pay while performing such duty. The ten percent provision remained in effect until repealed by the Act of June 10, 1922 (Department of Defense, 2005, p. 458).

Sea duty pay was revived in 1942 as a wartime measure. Additionally, this was the first time enlisted personnel were included within the scope of sea duty pay. Sea duty pay was again instituted as extra compensation with an additional ten percent of base pay paid to commissioned officers. Warrant officers and enlisted personnel would receive an additional 20 percent while performing sea duty. Since the Navy was conscripting its force, the reason this pay was authorized during World War II would not appear to be as a means to compensate for the arduous nature of fighting at sea. Instead, this was likely used to increase morale of the Sailors, thus providing an explanation for why enlisted personnel were not only included for the first time but were also paid a higher percentage of their base pay. A few months later, the Pay Readjustment Act of 1942 codified these sea duty pay provisions into permanent law (Department of Defense, 2005, p. 458).

2. Post World War II

In 1948, an Advisory Commission on Service Pay, at the request of the Secretary of Defense, undertook the first comprehensive study of military compensation in nearly forty years. This Commission, commonly known as the Hook Commission, recommended that sea duty pay be abolished for officers but continue in a modified form for enlisted personnel. For enlisted personnel, the Commission proposed a flat rate increase that was similar to accepted industry practice for disagreeable or unpleasant work and as a morale factor (Department of Defense, 2005, p. 459). Agreeing with the Hook Commission's recommendations, Congress adopted the Career Compensation Act of 1949. This act eliminated sea duty pay for officers and changed the way the entitlement was computed for enlisted personnel.

The Career Compensation Act of 1949 provided sufficient pay rates for 1949 but the ensuing years brought increasing concerns over retention and morale. The various increases in military pay rates over the next thirty years reduced the value of sea pay to the enlisted personnel. The decline in value of sea duty pay reduced its ability to affect morale and retention. The ability to impact morale and retention had been one of the major reasons behind including enlisted personnel in the sea duty pay program in the first place. Sea duty pay was starting to be seen as more of a token entitlement that had little incentive or morale value for affected personnel. (Department of Defense, 2005, p. 460)

3. 1970's to Present

The Department of Defense Appropriation Authorization Act of 1979 adopted a new special pay program to address a perceived problem with retention of qualified enlisted personnel in the Navy. This new special pay program would become the CSP program known today. During this time, the Department of Defense noted that sea pay had "historically been a means of recognizing and compensating those who were willing to serve under the unique conditions of service associated with sea duty" (Department of Defense, 2005, p.461). Citing the unattractive features associated with the "unique conditions" of sea duty and the "competition for quality manpower among the services

and with civilian industry," the Department of Defense recommended this new career sea pay program to achieve "stabilized manning [of Navy ships] with experienced personnel" (Department of Defense, 2005, p. 461). CSP was recommended to Congress as a "special pay," but was considered by the Department of Defense to be very important in "influencing the decision of skilled individuals to continue a career of service entailing repetitive reassignment to duty at sea" (Department of Defense, 2005, p.462). After the passage of the Act of 1979, CSP had become not just an extra compensating wage for the unique conditions of sea duty, but also an incentive pay designed to meet the Navy's manpower management objectives. Consequently, the scope of the CSP program changed significantly at this time.

In order to meet the goal of the new sea duty pay program, Congress continued to adjust CSP rates throughout the 1980's. The Navy's shortage of petty officers in the six to twelve year range of service prompted more increases in pay rates. This was the first instance where the Navy used CSP to specifically "target" or "focus" on special retention problem areas by providing retention incentives to Navy personnel coming to the end of their first term of enlistment. (Department of Defense, 2005, p.463)

The Military Pay and Allowances Benefits Act of 1980 adopted an entirely new structure of special pay for CSP. Special pay for career sea duty was again authorized for officers as well as enlisted personnel in pay grades E-4 and above. The only exception being officers in pay grades O-1 and O-2 who had less than four years of active enlisted or noncommissioned warrant officer service (Department of Defense, 2005, p.463). Officer sea pay was reinstituted "because of the arduous duty and family separations involved in long deployments at sea and because of retention problems among Navy officers in certain skills" (Department of Defense, 2005, p.464). Career sea duty pay rates were again increased because such action "specifically targets manpower dollars in an efficient way to improve the retention of Navy personnel in sea service skills" (Department of Defense, 2005, p. 464). The last change brought about from this provision was the establishment of the Career Sea Pay Premium (CSPP). This special provision allowed an additional $100 per month to be paid to any member of a uniformed service entitled to CSP for each subsequent month over 36 months of consecutive sea

duty (Department of Defense, 2005, p.463). CSPP was adopted at the urging of the Navy "to compensate ... members who are on prescribed sea tours of greater than three years and as an incentive for ... members who are on three year sea tours or less and who volunteer beyond the prescribed sea service tour" (Department of Defense, 2005, p. 464).

This revised CSP program was intended primarily to address retention problems. In 1980, the Senate Armed Services Committee stated in Report No. 96-1051 that “sea pay rates at the current levels were insignificant in relation to basic pay and as such are not achieving the career force retention and accession objectives which currently impact the at sea duty manning. The additional compensation realized from the proposed sea pay increases will be most effective in the retention of skilled enlisted personnel. This sea pay proposal was a specifically directed cost-effective method of correcting the critical shortage of career force personnel in sea duty assignments.” (quoted in Department of Defense, 2005, p. 465)

Career sea pay was one way to influence personnel to enter and remain in skill specialties entailing sea duty. These provisions enacted during the early 1980’s have started to highlight the many challenges faced with the design and implementation of the CSP program.

The later half of the 1980’s saw only a few changes in CSP. There were further revisions of the CSP program at the urging of the Department of Defense which entailed more structural changes. The CSP rates were increased for warrant officers in pay grades W-3 and W-4 along with the addition of four new cumulative-years-of-sea-duty categories for all warrant and commissioned officers. Additionally, the prohibition on payment of CSP to officers in pay grades O-1 and O-2 with less than four years of active enlisted or noncommissioned warrant officer service was removed.

Another change to take place during this time was in the definition of “sea duty.” Prior to this, the term “sea duty” referred to only the time spent on a ship while it was out to sea. This earlier, narrow definition of sea duty limited the rate of sea credit an individual accumulated. Since sea pay was based on the cumulative-years-of-sea-duty, the amount of sea pay and the rate of any sea pay increases were also limited. This had

the potential to influence the willingness of personnel to enter and remain in sea duty assignments. The term "sea duty" as now defined includes all time spent on a ship whether it is at sea or in port. (Department of Defense, 2005, p. 469)

This new way of defining sea duty had two effects. First, this new definition of sea duty allowed members assigned to ships whose primary mission is accomplished in port to draw sea pay whenever the ship is away from its homeport. Prior practices limited members assigned to such ships entitlement to sea pay only when their ship was away from its homeport for more than 30 consecutive days. Second, it allowed members to accumulate sea duty credit while assigned to the same type of duty. Although, individuals serving in these types of sea duty assignments do not receive sea pay regularly, this change had long term implications for personnel and their career decisions. If an individual stayed in the Navy long enough to reach their next sea duty assignment they could potentially benefit from an increase in the amount of CSP they might be entitled to from the additional sea credit accumulated.

The most recent changes to CSP were initiated by the National Defense Authorization Act for Fiscal Year 2001. A few changes in the rate structure for both CSP and CSPP were made and the congressionally established pay table that had been in existence since the Military Pay and Allowances Benefits Act of 1980 was eliminated. Additionally, service secretaries received authorization to prescribe the CSP and CSPP rates for all members serving under their jurisdiction. The significance of this change is that personnel from each military branch could receive CSP at a different rate. Also, the services could change the CSP and CSPP rates without formal authorization by Congress; however, the funds must still be appropriated by Congress. The only stipulation placed by Congress was the maximum monthly rate for CSP was set at $750 and the maximum monthly rate for CSPP was placed at $350. (Department of Defense, 2005, p. 473)

As one of the oldest special pays in existence, sea pay has continued to evolve to meet the needs of the Navy and military services. The legislative authority behind CSP (37 U.S.C. S305a) states that CSP is to provide a special payment to personnel serving on sea duty in recognition of the greater-than-normal rigors or service attending such duty, and to efficiently target manpower dollars to improve the retention of personnel in sea-

service skills. The most recent Office of the Chief of Naval Operations Instruction (OPNAVINST) 7220.14, states that Career Sea Pay is to provide a key distribution tool for the Navy as well as provide a special payment in recognition of the greater-than-normal rigors of sea duty, the arduous duty involved in long deployments, and the repetitive nature of assignment to such duty (Chief of Naval Operations, 2005). The one common thread throughout the history of this program is that CSP attempts to compensate for the greater-than-normal rigors of the sea duty. What is not clear is the whether or not CSP effectively meets manpower management goal of stabilizing the manning levels of Navy ships with experienced personnel.

H. CHAPTER SUMMARY

The military compensation system differs greatly from systems found in similar hierarchically structured civilian organizations. While some find these differences to be problematic, others suggest that the unique characteristics of the military promotion process and the distribution of preferences of the people serving minimize the effects of the differences. Career Sea Pay is one component of the military compensation system. Since the late 1800's when sea duty pay was structured as an addition to base pay, the Navy has used CSP to overcome the hardships imposed by sea duty. Hence, CSP could rightly be classified as a compensating wage. Although the theory of compensating wages has been accepted for many years, empirical evidence shows that effort is compensated more than unpleasant job characteristics. One unpleasant job characteristic, long working hours, can be measured to see the effectiveness of CSP as a compensating wage. Over the last twenty-five years, CSP has been studied more for its retention effects than for its compensating effects. The use of CSP has an impact on such retention factors as military-civilian pay differential, marriage, and geographic location; however, the most direct and important effect of CSP is on sea duty. Sea duty has an inverse relationship with retention. Since CSP compensates for sea duty and raising CSP generates more sea duty, CSP is a less efficient and effective retention tool than bonuses geared toward encouraging reenlistment. A thorough analysis of the Navy's use and intentions of sea duty pay reveals that one constant goal of this special pay is to reward

the extra effort service at sea demands. In conclusion, this review suggests that the best way to study the cost effectiveness of CSP is to investigate its effect on sea duty.

III. DATA COLLECTION AND PRESENTATION

A. CHAPTER OVERVIEW

Having reviewed relevant literature and previous studies, the project team endeavored to collect data necessary to perform an empirical and statistical analysis of the effectiveness of CSP and CSPP payments as means to encourage personnel to serve sea duty. These data came from a variety of sources throughout the Navy, the Department of Defense, and the federal government. Each of the primary types of data is discussed. First, inflation data and its use in this project to normalize various costs and pays are explained. Second, survey responses related to satisfaction with sea duty and pay are presented. Third, historical sea tour completion data are explained. Fourth, the procedures and assumptions for collecting and aggregating various personnel data that indicate the number of additional months personnel are willing to serve at sea are described. Finally, data related to costs that this project hypothesizes have influenced the creation of those additional months at sea are presented. Appendix B contains the most of the data documented in this chapter.

B. INFLATION DATA

Historical base pay and sea pay tables from 1983-2006 were retrieved from the Defense Finance and Accounting Service (DFAS). To accurately compare dollar values across time periods, a standard needed to be established and applied to the values to correct for inflation. There is no one correct way to calculate inflation. The federal government, for example, has multiple economic indicators that are used for adjusting nominal dollar values. This project uses the Consumer Price Index (CPI) to calculate inflation. The CPI is published by the United States Department of Labor, Bureau of Labor Statistics (BLS). Within the CPI there are numerous indexes. Since most large

Navy facilities are located near urban areas, the Consumer Price Index for All Urban Consumers (CPI-U) is used in this project as the economic indicator to adjust dollar values across years.

To make consistent comparisons of enlisted pay rates over time using the CPI, a base year must be selected. Next, a multiplier is derived for each year to convert historical Then Year dollars to Base Year dollars. For this project, all dollar values will be adjusted using 2006 as the base year. The first step in this process is to subtract the Then Year CPI from the Base Year CPI. The difference is then divided by the Then Year CPI. The resultant quotient is multiplied by 100 to yield the inflation rate percentage. The formula for calculating inflation is provided in Equation 1.

[(Base Year CPI – Then Year CPI) / Then Year CPI] * 100 = Inflation Rate

Equation 1. Inflation Rate Formula

The year 1998 is used as an example to show how a value for a given year was converted to 2006 dollars. The CPI yearly averages for 1998 and 2006 are 163.0 and 201.6, respectively. Inserting these values into Equation 1 as presented in Figure 1, the inflation rate from 1998 to 2006 is calculated to be 23.68 percent. This process was repeated for years 1983-2006.

Inflation Rate = [(Base Year CPI – Then Year CPI) / Then Year CPI] * 100
= [(201.6 – 163.0) / 163.0] * 100
= [(38.6) / 163.0] * 100
= [.2368] * 100
= 23.68%

Figure 1. Inflation Calculation

With the inflation rates from all previous years to the base year of 2006 known, the Then Year dollars need to be converted to 2006 dollars for an accurate comparison. Going back to the 1998 example, a comparison can be conducted on base pay for an E-5 with over six cumulative years of service (CYS) between 1998 and 2006. Historical pay

data from DFAS indicates that the monthly basic pay for 1998 and 2006 is $1,558.20 and $2,273.70, respectively. The monthly pay of $1,558.20 is multiplied by the inflation rate, 23.68 percent, to yield the adjusted value to be added to original value to correct for inflation as shown in Figure 2.

Then Year Value * Inflation Rate = Inflation Product
$1558.20 * 23.68% = $368.98
Inflation Product + Then Year Value = Base Year Value
$1558.20 + 368.98 = $1927.18

Figure 2. Base Year Calculation for Monthly Basic Pay, E-5 with 6 CYS

The monthly basic pay for an E-5 with over six CYS in 1998 is actually worth $1927.18 in 2006 dollars. Basic pay for 1998 can now be accurately compared with 2006. The actual pay in 2006 for an E-5 with over six CYS was $2273.00. This calculation clearly illustrates an E5 over six CYS earned more money in 2006 than he or she would have in 1998. These calculations were repeated to adjust base pay and sea pay from 1983 to 2006 to values in 2006 dollars. These values can be used for trend analysis to compare sea pay values for various pay grades across multiple cumulative years of sea duty (CYSD).

C. ARGUS CAREER MILESTONE TRACKING SYSTEM SURVEY DATA

The Naval Personnel Command (NPC) Center for Personal and Professional Development, Analysis maintains data from the ARGUS Career Milestone Tracking System. For this project, NPC provided ARGUS survey questionnaire data for each Navy active duty enlisted pay grade. These data were provided in two sections: before 21 August 2003, and after 21 August 2003. Within each section, the six questions pertinent to this project were provided by pay grade of the survey respondent, and the number of responses for each choice on a scale of one to seven. Table 6 shows the ARGUS survey questions of interest for this project.

1. Number of hours put in at sea to get the job done.
2. Number of hours put in while in port to get the job done.
3. Number of hours put in on an average day to get the job done.
4. Amount of pay you receive.
5. Amount of base pay
6. Amount of Sea Pay you receive

Table 6. ARGUS survey questions. (NPC, Center for Personal and Professional Development, Analysis)

ARGUS is a web-based survey that gathers Sailors' responses on quality-of-life issues such as Navy services, job satisfaction, and military pay and benefits that affect their future career decisions. Respondents indicate their opinion on each issue on a scale of one through seven, with one indicating an issue influenced a Sailor to consider leaving the Navy and seven indicating an issue influenced a Sailor to consider staying in the Navy. The survey is nominally required whenever sailors reach career milestone events such as reenlistment, advancement, transfer, or re-designation (Chief of Naval Operations, 2006). Using the data provided, the questions from each section were combined into three pay-grade groupings: E1-E3, E4-E6, and E7-E9. Once that process was complete, the average response to each question for each pay-grade group was computed. Some questions had more responses than others so it is assumed that those questions should carry more weight towards the group average. In order to capture the relative importance of the choices within each question, the weighted average method was used to compute the pay-grade group average response for each question of interest from the survey. The weighted average was computed for each pay-grade group using Equation 2.

$$\frac{\sum(\text{Rank of Question [from 1 to 7]})*(\text{Number of Responses for the Rank})}{\sum(\text{Total Number of Responses})}$$

Equation 2. Weighted Average Formula for ARGUS Survey Responses

Appendix B provides the summary of the total number of responses and the weighted averages of those responses for the two periods of data provided by pay-grade group. From these data, the project team performed a trend analysis to investigate the influence of quality-of-life and job satisfaction on the willingness of personnel (by pay-grade group) to stay in the Navy.

D. PRESCRIBED SEA TOUR (PST) DATA

For this project, the Allocation and Statistics Branch of NPC provided a data file that gave a current snapshot of all enlisted active duty personnel in all ratings who have exceeded their prescribed sea tour (PST). The file contained various parameters for an individual that existed at a time the information was requested. These parameters include the Unit Identification Code (UIC) of the person's assignment, the Date Received (or day the person arrived at their listed assignment), Command Name, and the Date Transferred (date the person transferred or will transfer). These parameters were provided in addition to standard information such as the individual's rate and pay grade. Some individuals were not counted as they were still completing their PST (split tours) or were in ratings that didn't have a PST. CTs and MAs are examples of ratings not having a PST.

Using this information, the number of personnel who exceeded their PST for each year was identified by pay grade for fiscal years 2000 to 2006. Additionally, the total number of personnel who exceeded their PST in each of the five ratings of interest was also identified by pay grade for fiscal years 2000 to 2006. Because individuals who exceeded their will usually have completed multiple sea tours, NPC analysts had to review each member's history to sum tour lengths when they went from sea to sea in order to get the most accurate data. Currently, there is no way to identify the exact moment when individuals exceed their PST. This project's authors assumed the date individuals arrive (Date Received) at the listed assignment is the moment they exceeded their PST. Appendix B shows the summary of the PST information provided by NPC.Using this information, a trend analysis was performed to investigate potential reasons for an increase or decrease in personnel exceeding their PST within each rating of interest and the Navy as a whole.

E. DEFENSE MANPOWER DATA CENTER DATA

1. End Strength Data

The Defense Manpower Data Center (DMDC) provided quarterly end strength data for all Navy active duty enlisted ratings for years 2001 through 2006. These data were provided in three pay-grade groupings: E1-E3, E4-E6, and E7-E9. Within each grouping, the number of personnel in each rate was provided based on the type of duty to which they are assigned. The Navy uses a numerical classification system to indicate the type of duty a member is performing. These codes, as specified in MILPERSMAN 1306-102 are summarized as follows (Chief of Naval Personnel, 2003):

> **Sea/Shore Type Duty Code "1"**: Duty performed in United States (U.S.) (including Hawaii and Anchorage, Alaska) land-based activities where members are not required to be absent from the corporate limits of their duty station in excess of 150 days per year, or long-term schooling of 18 or more months;
>
> **Sea/Shore Type Duty Code "2"**: Duty performed in commissioned vessels and deployable squadrons homeported in the U.S. (including Hawaii and Alaska); U.S. land-based activities and embarked staffs, which require members to operate away from their duty station in excess of 150 days per year;
>
> **Sea/Shore Type Duty Code "3"**: Duty performed in a land-based activity, which does not require members to be absent more than 150 days per year, but is credited as sea duty for rotational purposes only due to the relative undesirability of the geographic area;
>
> **Sea/Shore Type Duty Code "4"**: Duty performed in commissioned vessels and deployable squadrons homeported overseas; overseas land-based activities and embarked staffs, which require members to operate away from their duty station in excess of 150 days per year;

> **Sea/Shore Type Duty Code "6"**: Duty performed in overseas land-based activities, which are credited as shore duty for rotational purposes. Members are not required to be absent from corporate limits of their duty station in excess of 150 days per year.

Per OPNAVINST 7220.14 which defines CSP and CSPP, only those personnel serving in type duty code "2" and "4" billets when embarked on a vessel that can get underway are entitled to special pay (Chief of Naval Operations, 2005). Therefore, using the DMDC data provided, the total number of personnel serving in type duty code "2" and "4" billets were summed for each rating of interest (BM, CTI, FC, MA, OS) within each pay-grade group in each period data were available. This total is the number of people eligible for CSP and potentially CSPP during each period. A similar summing procedure was undertaken for those personnel assigned to type duty code "1," "3," and "6" billets to determine the total number of personnel within each rating of interest assigned to a land-based billet who were ineligible for CSP or CSPP. From these data, a trend analysis was performed to investigate the percentage of personnel within each rating assigned to CSP and CSPP eligible billets over time. These data are presented in Appendix B.

2. Personnel Tracking Data

DMDC constructed a data set for this project from individual information within its Enlisted Master File. This data set covered all enlisted active duty personnel in the ratings of interest from October 2000 through December 2006. Each file compares various parameters for an individual at the base time to the same parameters for that individual that existed at a time six months later than the base time. These parameters include the UIC of the unit to which the person was assigned at the given time, the End of Active Obligated Service Date (EAOS) the person had at the given time, the duty type code for the UIC that person was assigned at the given time, and the number of months that person had served at in that UIC and pay grade. These parameters were provided in addition to standard information such as the individual's rate and pay grade.

Using these parameters, DMDC compared the individuals' status at the base time to his or her status six months later. For some of these comparisons, DMDC generated a

set of “Yes” or “No” conditions that could be used to sort and aggregate the individual data. These conditions were specified for whether there was a change in an individual’s UIC, EAOS, or duty type. If the change in EAOS condition was returned as “Yes,” DMDC calculated the number of months the EAOS was extended or reduced. Furthermore, DMDC specified if the duty type at each time period qualified as sea duty eligible for CSP and CSPP. In addition to the “Yes” or “No” comparisons, DMDC also calculated the number of months the individual was at his or her UIC and within his or her pay grade at each time period. The former information could be used in conjunction with data for required sea tour lengths to determine the number of additional months of sea duty that would be generated if an individual changed his or her EAOS. The latter information could be used to determine if the individual was promoted in the six-month interval by noting if the amount of time in pay grade at the base time was more than the time in pay grade six months later. Using the information available in this data set, the project team endeavored to extract a measure of the number of additional months of sea duty that was generated during each six-month period from three different means: a consecutive sea tour, an extension, and a reenlistment. These means and the process to measure the months generated through these means are described below.

To determine if an individual would serve additional sea duty through a given method, different conditions were compared. For a consecutive sea tour to be performed, two conditions need to be met. First, the individual’s UIC would have to change during the six-month period; second, the person would have to be serving in a sea duty type code at the beginning and end of the six-month period. If both these conditions were true, that individual was recorded as performing consecutive sea tours. Calculating the number of months of additional sea duty created through this method required an assumption since the change in UIC could be for a number of reasons. For example, there could be a case where a person currently serving onboard a ship that is in a maintenance period could be transferred temporarily to another ship due to get underway for a deployment if the latter ship had a manning shortfall. In this case, no real additional sea duty is generated since the individual is merely completing the current sea tour in another UIC. In contrast, the individual may have transferred from one sea duty billet to another after completing a full

prescribed sea tour and his or her EAOS is far enough in the future where that individual will complete another full prescribed sea tour. There is also the case in which the individual's EAOS is scheduled prior to completing the nominal length of the second sea tour. Thus, to calculate the number of additional months of sea duty generated by an individual meeting the conditions of consecutive sea duty, it was assumed that one half of the prescribed sea tour length for that individual's rate at the time would be completed.

The processes for determining whether an individual extended or reenlisted while at sea are similar. The determining factor for distinguishing between the two is the length of change in an individual's EAOS. Again, two conditions needed to be met to determine if one of the situations existed. First, an individual needed to be serving in a sea duty billet at the base time. Second, the date of the individual's EAOS must have changed in the six-month period of interest. If both conditions were true, the length of the change in EAOS was examined to determine if an extension or reenlistment occurred. If the length of change was less than thirty-six months, the change was assumed to be an extension; if greater than or equal to thirty-six months, a reenlistment. This distinction was made because for a Sailor to be eligible for a Selective Reenlistment Bonus (SRB), a thirty-six month or longer service contract must be signed.

The SRB pay could be an influence in the decision in addition to CSP or CSPP; therefore, to conduct any additional analysis, this distinction needed to be made. The number of additional months of sea duty generated by this decision was determined by comparing the length of change in EAOS to the number of remaining months in the individual's current sea tour. If the individual was serving in a sea duty billet at the end of the six-month period and his or her change in EAOS was longer than the remaining number of months remaining in the sea tour (determined by subtracting the number of months served at the UIC at the base time from the length of a prescribed sea tour for the individual's rate), the remaining number of months in the sea tour was used as the value for additional months generated; otherwise, the length of change in EAOS was used for the number of additional months generated. Consequently, the project team assumed that an extension or reenlistment decision was made at the base time. If the individual was no longer serving in a sea duty billet at the end of the six-month period, the number of

additional months of sea duty generated was found by subtracting the number of months the person was at his or her UIC at the end of the six-month period from six months.

For each method, an individual was determined to be eligible for CSPP at the time of his or her decision. To be eligible for CSPP, an individual must serve 36 consecutive months in a sea duty billet. Thus, if an individual was in a UIC classified as a sea duty billet and she or he had been in that UIC for 36 months at the base time, the individual was considered eligible for CSPP payments.

The above evaluations were made for each individual. Once complete, the total number of consecutive sea tours, extensions, and reenlistments as well as the number of additional months of sea duty created during that six-month period were aggregated by rate for the ratings of interest. Although the number of months of sea duty generated for an individual often was longer than the six-month period of interest, all of those months were credited to the time period examined. This is a reasonable assumption because the decision to perform consecutive sea duty, extend, or reenlist was made based on conditions (i.e., CSP rates, CSPP rates, SRB rates, and advancement opportunity) existing at that time.

To analyze the impact of advancement potential as a factor in these decisions in the project, pay grades E1 through E3 were aggregated as were pay grades E7 through E9. This was done since exams are only offered for advancement to pay grades E4 through E7. This process was repeated at six-month intervals beginning in October 2001 through April 2006 to provide data for fiscal years 2002 through 2006. The results of this process are presented in Appendix B.

F. COST DATA

1. Annual CSP and CSPP Cost Data

NPC Resource Management Division maintains data on annual payments made for CSP and CSPP programs. For this project, NPC provided the total annual costs of the CSP and CSPP programs for fiscal years fiscal years 2000 through 2006 and the total annual costs for the five ratings of interests for fiscal years 2005 and 2006. The by-rating

data is limited because the Navy did not start accumulating CSP and CSPP pay data by rating until 2005. Previously, CSP and CSPP costs were only collected by UIC. Consequently, the only relevant CSP and CSPP cost data available for fiscal years 2002 through 2004 is aggregate cost for the entire Navy. To estimate these costs by rating for this time period, an assumption had to be made. The assumption used for this project is that CSP and CSPP costs for a given year are proportional to the number of personnel within a given rating in that year. This assumption is considered valid since the proportion of personnel within each rating grouping is generally constant over the years of interest as indicated by the end strength data provided in Appendix B.

Knowing the CSP and CSPP costs by rating in fiscal year 2005 and the total CSP and CSPP costs in fiscal year 2005, a ratio of individual rating cost to total cost was be calculated. This ratio was adjusted for fiscal years 2002 through 2004 by multiplying it by the ratio of the average number of personnel in each rating of interest assigned to a type duty "2" or "4" billet in one of those years to the average number of personnel in each rating of interest assigned to a type duty "2" or "4" billet in fiscal year 2005. After this adjustment, the per-rating CSP and CSPP costs were determined by multiplying the total CSP and CSPP cost for the fiscal year being determined to the adjusted 2005 rating cost to total cost ratio. An example to calculate Boatswain Mate CSP cost for fiscal year 2003 is shown in Figure 3 below.

$$\left[\left(\frac{\text{FY05 CSP COST}_{BM}}{\text{FY05 CSP COST}_{TOTAL}}\right)\left(\frac{\text{AVG FY03 PERSONNEL}_{BM\,TYPE\,2,4}}{\text{AVG FY05 PERSONNEL}_{BM\,TYPE\,2,4}}\right)\text{FY03 CSP COST}_{TOTAL}\right] = \text{FY03 CSP COST}_{BM}$$

Figure 3. CSP Cost Estimation Calculation Example

The cost data, converted to 2006 dollars by the process described in the Inflation Data section above, is presented in Appendix B. This project explored the relationship between changes in CSP and CSPP payment amounts over time using the information provided by NPC. Additionally, the trend over time was compared to other career milestone changes such as extensions, reenlistments, and willingness to complete sea tours to determine if CSP and CSPP haves some influence on these factors.

2. Selective Reenlistment Bonus Cost Data

The Deputy Chief of Naval Operations (Manpower, Personnel, Training and Education) (MTP&E) is responsible for the Selective Reenlistment Bonus (SRB) program. Program data are maintained by the Enlisted Bonus Programs for the Chief of Naval Personnel (OPNAV N130D). OPNAV N130D provided the total number of SRB's and the associated dollar amount for all naval personnel within the ratings of interests for this project. These data were further subdivided by Navy Enlisted Classification (NEC) and by reenlistment eligibility zones. NEC's are specific codes designated to individuals who possess a specialized skill or qualification. The total number of SRB's and associated dollars amounts of all three zones were summed for each rate and the rate's associated NEC's from 2000 to 2006. Those data are provided in Appendix B.

Per OPNAVINST 1160.9, SRB's are only eligible to sailors who have completed at least 17 continuous months of active naval service but not more than 20 years of active military service. The minimum length of reenlistment for which an individual can be eligible for an SRB is three years. There are three zones a Sailor can reenlist and receive an SRB: Zone A, a Sailor has served a minimum of 17 months but not more than six years; Zone B, a Sailor has served a minimum of six years but not more than 10 years; Zone C, a Sailor has served a minimum of 10 years but not more than 14 years. Rating or skills meriting an SRB are assigned a specific award level ranging from .5 to 15 in .5 increments. The level of SRB payment also varies and is capped at a $90,000 ceiling. The formula for determining the SRB amount is monthly basic pay multiplied by the additional months of reenlistment. The product value is then divided by 12. The quotient value is then multiplied by the award level for the reenlistment bonus payout. (Chief of Naval Operations, 2007) The formula for determining the SRB is shown in Equation 3.

[(Monthly Basic Pay * Additional OBLISERV in months) / 12] * Award Level

Equation 3. SRB Calculation Formula.

MTP&E uses the SRB as a monetary tool to achieve retention requirements necessary for appropriately structuring the enlisted force. MTP&E conducts reviews at least annually to ensure sufficient awards levels are offered to critical ratings and NECs to maintain proper manning. It then publishes the changes via naval message. The review process takes several key factors into consideration, including a history or projected trend of under manning in a rate or NEC, high training and replacement costs, and the criticality of a skill for the Navy to successfully complete its mission. MTP&E only makes the changes only if they are confident it will improve retention in the targeted rate or NEC. MTP&E has the option of increasing or decreasing award levels and SRB payments in any zone. (Chief of Naval Operations, 2007) This review process explains why Boatswain Mates were first awarded SRB's in 2005 and 2006.

3. Advancement Cost Data

a. Naval Education and Training Professional Development and Technical Center Data

The Naval Education and Training Professional Development and Technical Center (NETPDTC) maintains data on advancement statistics. For this project, NETPDTC provided the number of personnel advanced and the total number of people taking an advancement exam at every Navy UIC for all advancement exams (E-4 to E-7) for fiscal years 2002 through 2006. Using information provided by DMDC, each UIC was identified by its type duty code. Once this process was complete, the total number of people advanced and the total number of people taking each advancement exam for each cycle was aggregated by type duty and rating of interest. With this information, two things were determined. First, it is possible to see if there is an increased opportunity for personnel to advance while in a sea duty billet or if the opportunity is greater for those on shore duty. Second, with the total number of people being advanced during each advancement cycle, the cost to the Navy for advancing these personnel was calculated by making a couple of assumptions. This procedure is described below.

b. Advancement Pay Differential Costs

To calculate the cost of advancing personnel, it is necessary to determine the base pay differential between different rates. This was accomplished using historical pay tables available from DFAS. Since base pay is a function of both pay grade and years of service, an expected value for the pay differential must be calculated. The expected value is found by summing the product of the pay differential at a given year of service and the probability of advancing to the next pay grade in that year of service.

Statistical theory suggests that for large populations, the probability distribution is likely to be normal; however, in the Navy advancement system, points toward advancement are awarded for those that pass an advancement exam but who are not advanced. These points are cumulative and apply to subsequent exam scores to increase the likelihood of advancing over time. Thus, this project applied a normal probability distribution with a slightly positive skew for each pay grade bounded by minimum time-in-rate requirements at the low end and high year tenure requirements at the high end. If pay differentials are not given for to the high year tenure value, this value was not available in the pay table or was the same as the previous year of service differential. High year tenure for pay grades E-4 through E-6 for the years of interest are identified in Naval Administrative Message (NAVADMIN) 208/02 and in NAVADMIN 056/05 which are summarized in Table 7 (Chief of Naval Operations 2002 and 2005). The expected value for pay differentials by pay grade and year is presented in Table 8.

PAY GRADE	HIGH YEAR TENURE (YEARS)	
	2002 – MAR 2005	MAR 2005 - PRESENT
E-4	10	10
E-5	20	14
E-6	20	20

Table 7. Summary of High Year Tenure for Pay Grades E-4 through E-6

	Year					
Promotion to Pay Grade	2001	2002	2003	2004	2005	2006
E4	$144.63	$131.28	$170.05	$174.26	$180.35	$185.86
E5	$124.95	$151.47	$171.42	$195.09	$201.87	$208.14
E6	$200.19	$221.22	$242.15	$262.19	$271.38	$279.81
E7	$268.65	$313.91	$312.83	$335.04	$346.87	$357.53

Table 8. Expected Value of Basic Pay Advancement Differentials 2001-2006 (Current Year Dollars)

Exams are offered twice each year for advancement to pay grades E-4 through E-6 (in March and September) and once each year for advancement to E-7 (January). Additionally, personnel who are advanced are not immediately paid at their new pay grade, but are staggered based on their advancement exam score. Thus, an assumption has to be made to calculate the advancement cost resulting from each exam cycle. Conservatively, this project assumes that all personnel advanced during a cycle are paid immediately. Therefore, personnel advanced in the September cycle are paid for all 12 months of the following fiscal year, personnel advanced in January for the remaining eight months of the fiscal year, and those personnel advanced in March for the remaining six months of the fiscal year.

G. CHAPTER SUMMARY

This chapter describes the project data. Each data set was described by source, content, and the procedures undertaken to convert the raw data to a form useful for analysis with assumptions explicitly stated. The following chapter describes the project's methodology for using these data to analyze the cost effectiveness of CSP and CSPP as means to generate sea duty for the Navy.

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IV. METHODOLOGY

A. CHAPTER OVERVIEW

This chapter describes the procedures and reasoning applied to examine the effectiveness of CSP as a compensating wage and a retention tool. The data collected and described in Chapter III allow for empirical and statistical analysis to be performed. These analyses determine relationships (if any) between the amount of compensation allotted for the Career Sea Pay and the willingness to perform sea duty. The chapter is organized into three sections. First, the process for analyzing the change in real purchasing power of CSP over time is presented. This trend will be analyzed by pay grades examining the change in CSP over time. Second, the approach to empirical analysis of trends in survey data and sea tour extension rates is outlined. The goal of this section is to estimate the influence the 2002 change in CSP rates had on job satisfaction and the desire to remain at sea. Finally, the chapter discusses the statistical methods used to measure if a significant relationship exists between various forms of compensation and the number of months of sea duty generated by extension or reenlistment. This is done to assess the monetary value of CSP as a retention incentive.

B. INFLATION AND THE REAL VALUE OF CAREER SEA PAY

1. Purchasing Power and the Consumer Price Index

Due to inflation, the purchasing power of an individual's dollar declines from Year 1 to Year 2. The rate of inflation estimates the rate of this decline. Therefore, trying to compare the amount of compensation for a pay grade over any period of time without taking inflation into consideration is of little value since the same dollar amounts have differing purchasing power.

As mentioned in Chapter III, the CPI-U is used as the benchmark for converting Then Year dollars to 2006 dollars for the comparison. The CPI-U was chosen for two reasons. First, a majority of sea-based Navy bases are located within urban areas.

Second, the CPI-U encompasses a sample size of 30,000 individuals representing 87 percent of the total national population which provides data on all their purchases, the largest representation of its kind. The BLS further classifies these expenditures into 200 categories and eight major groups. The products purchased from the samples are then inputted into statistical programs that calculate the CPI for the time period of the purchases. This new CPI number represents the difference in the price the consumers paid for that basket of goods from the last observation period. The CPI-U data reflects total net changes of all allowable goods and services purchased by urban households.

With CSP values from 1983-2006 converted to 2006 dollars, CSP rates for selected pay grades can be charted and graphed to show trends due to inflation and changes in the CSP program. This project will use two samples with different rank and time of service for comparison and analysis. The first sample will be an E-4 with over four years of service and the second will be an E-5 with over six years of service. These two samples were chosen because they represent a typical Sailor at a point where a retention decision might be made. The trend in the value of CSP can provide insight into whether the CSP program has the same effect in compensating sailors in recent years as it did since the last congressional change.

2. Compensation for Hours Worked at Sea

Chapter II described the difference in the number of hours per week the Navy expects Sailors to work while in port and while underway. One simple way to measure the effectiveness of sea pay is to convert the payments into an hourly rate for the extra hours worked at sea. For this analysis, the CSP payments must be treated as an annuity payment. Since the Navy pays its personnel twice each month and each payment is for work accomplished, CSP payments could be considered an ordinary annuity (Megginson and Smart, 2006). The Navy specifies the number of underway days per quarter that are authorized for its fleet units. While this number varies from year to year, it is approximately 25 out of 90 days. The project team assumed all 25 days are spent underway at the end of the quarter. This allows CSP payments made earlier in the quarter to earn interest while not performing duty at sea which is meant to be

compensated. The project team assumes an eight percent annual return on CSP payments. Dividing the value of the CSP payments over the 3-month period by the extra hours worked for the time at sea during this period, an hourly rate of CSP can be calculated. This hourly rate will be calculated for various pay grades and years of sea duty over the period 2002 through 2006 in 2006 dollars. The equation for the future value of an annuity used in these calculations is presented as Equation 4.

$$FV = PMT * \left\{ \frac{\left[\left(1 + \frac{r}{24} \right)^{n} - 1 \right]}{\frac{r}{24}} \right\}$$

where PMT = ½ monthly CSP payment, r = Annual rate of return, and n = Number of pay periods

Equation 4. Future Value of an Ordinary Annuity

C. METHOD FOR EMPIRICAL ANALYSES

1. Argus Career Milestone Tracking System Responses

A trend analysis will be performed on the ARGUS data described in Chapter III. One way this project attempts to measure the effectiveness of CSP in overcoming the additional rigors of sea duty is through the empirical analysis of the results taken from selected questions on the Navy's ARGUS Career Milestone Tracking System. NAVADMIN 239/03 describes ARGUS as "a retention survey system designed to improve the understanding of key factors that influence retention decisions such as working conditions, military culture, leadership, training, pay and benefits." (Chief of Naval Operations, 2003) For this analysis, this project presents the change in the average response to six questions identified in Chapter III that illustrate individuals' views on their job satisfaction and the influence of certain pays, including CSP, on their willingness to remain in the Navy. The analysis explores if the increase in CSP in 2002 positively affects the willingness of personnel within each of three pay-grade groups to

stay in the Navy. These groups are E1 to E3, E4 to E6, and E7 to E9. The survey results are beneficial since they provide direct evidence of the financial effect of different compensation and quality-of-life changes on an individuals' retention decision.

2. Prescribed Sea Tour Extensions

Chapter II suggests that one way to measure the effectiveness of the CSP program is to look at the number of individuals who have exceeded their PST. Comparing this to the change in real value of CSP, it is anticipated that CSP will have some influence on an individual's decision to complete and extend their time at sea. A graphical trend analysis will be performed for calendar years 2000 to 2006 using the data in Appendix B. The graphs provide a visual representation of the number of individuals who exceeded their PST Navy-wide and for each of our five selected ratings of interest. With these graphs a comparison can be made between the yearly trend of those individuals who have exceeded their PST and the trend of the real value of CSP and CSPP during the same time period. External factors that may explain unexpected trends are also examined in an attempt to draw conclusions about the efficacy of CSP in performing one of its stated functions: to compensate for the arduous nature of sea duty.

D. STATISTICAL COMPARISON OF DATA SETS

1. Merging DMDC and Cost Data

The process for collecting and aggregating various cost data for the ratings of interest and the number of months of sea duty created by rating for fiscal years 2002 through 2006 is described in Chapter III. Previous research suggests that this determination could be made by examining whether these payments have any significant relationship to additional months of sea duty by Sailors (who either extend their current service contract or reenlist). Since additional pays that may encourage prolonging sea tours are available to Sailors, the project team attempts to determine their relationship to months of sea duty as well. These pays are additional salary received from advancing in pay grade and bonus payments offered for signing reenlistment contracts extending

service for more than three years. While Chapter II explains that these four pays are not the only influence on a Sailor's individual decision to remain at sea, they constitute a cost to the Navy that is large enough that the project team expects to see a positive return from these expenditures.

To measure this return, the months generated by extension and reenlistment must be compared to the relevant costs. While individuals choosing either option are eligible for CSP, CSPP, and advancement differentials, only those reenlisting are eligible for SRB payments. For this project, the project team considers months of sea duty generated by either extension or reenlistment to be dependent on the relevant pay amounts expended in the given year for a given rating. Each rating has five observations for each dependent variable, one each for fiscal year 2002 through 2006. Since five observations is a small sample, the project team attempted to merge observations from the ratings of interest that are considered sea-intensive (BM, FC, and OS) and those that are considered shore-intensive (CTI and MA). This would mean that each dependent variable has up to 15 observations for sea-intensive ratings and 10 observations for shore-intensive ratings. If the data sets can not be pooled together, they will be considered independently.

To test the appropriateness of pooling these observations, a statistical analysis to verify the distribution of the data among the ratings is performed. For two ratings to be pooled together, the population means of two available parameters, pay grade and months of service, must be statistically equal. Since the population size of each rating is large, a sample will be taken. This sample will consist of 500 random data points from each rating for each parameter where 100 data points are taken from each year being considered in the project's statistical analysis (2002-2006). For each parameter, the hypotheses to test are

$$H_0: \quad \mu_1 - \mu_2 = 0$$

$$H_1: \quad \mu_1 - \mu_2 \neq 0$$

where μ_1 is the population mean of a parameter for one rating and μ_2 is the population mean of the same parameter for a second rating. As it is unlikely that the variances of each parameter for each rating population are equal, the unequal-variances test statistic is

calculated. This is derived from the sampling distribution from Equation 5 (Keller, 2005). The test statistic is compared to the critical two-tail test statistic at the 10 percent significance level using the p-value method. The p-value is the probability of observing a test statistic of the same value or greater given that the null hypothesis, H_0, is true (Keller, 2005). In this case, if the p-value is greater than 0.1, we are unable to reject the null hypothesis in favor of the alternative hypothesis, H_1, and the means are considered equal.

$$t = \frac{\left(\overline{x_1} - \overline{x_2}\right) - \left(\mu_1 - \mu_2\right)}{\sqrt{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right)}} \qquad \nu = \frac{\left(s_1^2/n_1 + s_2^2/n_2\right)^2}{\frac{\left(s_1^2/n_1\right)^2}{n_1 - 1} + \frac{\left(s_2^2/n_2\right)^2}{n_2 - 1}}$$

where $\overline{x}$ = Sample mean, s^2 = Sample variance, n = Sample size, and ν = Number of degrees of freedom of the test statistic.

Equation 5. Test Statistic for Difference in Population Means with Unequal Variances

2. Spearman Rank Correlation Coefficient Test

Although each aggregated observation of months generated and all pays are taken from the entire population, since there are only 15 and 10 aggregate observations from sea-intensive and shore-intensive ratings, respectively, the use of techniques that assume normal distributions would not be proper for this portion of the analysis. Consequently, this project will use a non-parametric technique to explore if there is a statistical relationship between our dependent variables and the independent costs of CSP, CSPP, advancement, and SRB payments. This technique is the Spearman rank correlation coefficient. Unlike a standard correlation measurement, this technique attempts to determine if a relationship between data sets exists by utilizing the ranks of the values within each data set rather than the absolute values of the data themselves (Keller, 2005).

To perform this test, two sets of data are compared. One set is the hypothesized dependent variable, *y*, which for all cases in this analysis will be months of sea duty generated. The second set is the hypothesized independent variable, *x*, which will be one of the costs proposed to be relevant to generating those months of sea duty. Within each

data set, the relative rank of each value is determined. Once the ranks are established, the sample statistic, r_S, for the population Spearman correlation coefficient is calculated per Equation 6 (Keller, 2005).

$$r_S = \frac{s_{ab}}{s_a s_b}$$

where a and b are the ranks of x and y, respectively, s_{ab} is the covariance of the ranks and s_a and s_b are the standard deviations.

Equation 6. Sample Spearman Rank Correlation Coefficient

This project hypothesizes that there should be a positive relationship between the independent and dependent variables. Therefore, the two hypotheses to be tested are

$H_0: \quad \rho_S = 0$

$H_1: \quad \rho_S > 0$

where ρ_S is the population Spearman correlation coefficient. To determine whether the value of r_S is large enough to reject the null hypothesis, it is compared to critical values of the test statistic for one-tail tests at various levels of significance, commonly denoted by α (Keller, 2005). These critical values are published in statistical texts when the number of observations is less than 30, as is the case for this project (Keller, 2005). If the null hypothesis can be rejected in favor of the alternative hypothesis, it can be concluded that there is a positive relationship between months of sea duty generated and the costs proposed to be relevant to generating those months of sea duty that is significant, confirming this project's stated hypothesis. The p-value method will be utilized to determine the probability that the null hypothesis is true.

While this test indicates the presence of a relationship, it does not measure the magnitude of that relationship. The magnitude can be determined through linear regression techniques. Consequently, for any cost variable indicating a positive

relationship with months of sea duty generated for a given data set, a linear regression will be performed to calculate the cost of generating additional months of sea duty using that method of payment.

3. Linear Regression

Regression analysis is used to predict the value of one dependent variable based on the value of other independent variables (Keller, 2005). When there is only one independent variable, the simple linear regression model is used. This model is represented by Equation 7. To estimate the values of the coefficients in the model, the values obtained from this project's data set are used. The estimators are found by drawing a straight line through the sample data that minimizes the sum of the squared differences between the points and the line (Keller, 2005).

$$y = \beta_0 + \beta_1 x + \varepsilon$$

where y = Dependent variable, x = Independent variable, β_0 = y-intercept, β_1 = Slope, and ε = Error variable.

Equation 7. Simple Linear Regression Model

Once the least squares line has been constructed the results are assessed to test the fit of the line to the data. This is accomplished by performing a t-test on the estimate of the slope of the line. The null hypothesis for this test is that there is no linear relationship, meaning that the slope is zero. Thus, the hypotheses to be tested are

$H_0: \quad \beta_1 = 0$

$H_1: \quad \beta_1 \neq 0$

To test the hypothesis, a test statistic is compared to a critical t-value at a specified significance level. The test statistic is calculated using Equation 8. The p-value method is utilized to determine the probability that the null hypothesis is true.

$$t = \frac{b_1 - \beta_1}{s_{b_1}} \qquad \nu = n - 2$$

where b1 = Estimate of slope, s_{b_1} = Standard error estimate of b1, n = Number of data points, and ν = Number of degrees of freedom of the test statistic

Equation 8. Test Statistic for Slope of Regression Model

If more than one independent variable shows a positive relationship with the dependent variable from the results of the Spearman test, a multiple linear regression model will be used. The multiple regression model is similar to the simple linear regression model except that there are more independent variables and related coefficients. The goodness of fit of the model is tested in a manner similar to the method described above.

E. CHAPTER SUMMARY

This chapter describes the path this project will pursue to analyze the data gathered in Chapter III. By utilizing numerous sets of data, the project attempts to take an all-around approach to draw a conclusion regarding the viability and effectiveness of the Career Sea Pay program as a compensating wage. The following chapter uses the techniques described above to analyze the accumulated data.

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V. ANALYSIS

A. CHAPTER OVERVIEW

This chapter utilizes the data described in Chapter III and applies the methods outlined in Chapter IV in an attempt to identify key trends in the value of CSP and whether that pay affects willingness to perform sea duty. First, historical trends in the real dollar value of sea pay are presented to demonstrate the effect of inflation on CSP purchasing power. This analysis is augmented by a brief discussion of the hourly compensation rate for time spent underway. Second, empirical analysis of survey data and sea tour completion rates is conducted to infer the response of Sailors to the change in sea pay value. Finally, a statistical analysis is undertaken to determine if various forms of compensation have any relationship to the generation of sea duty through extension or reenlistment.

B. INFLATION AND THE REAL VALUE OF CAREER SEA PAY

1. Purchasing Power Trends for Career Sea Pay

To accurately compare dollar values across time, the CPI-U has been selected as the economic instrument to convert nominal dollar values to a constant base year purchasing power. As depicted in Figure 4, the CPI-U has steadily risen every year from 1983 to 2006. The rate of increase over this 24 year period has averaged 3.125 percent. Congressional lawmakers have passed an increase in base pay every year for the past ten years so that the purchasing power for each rank and rate remains comparable over time. As an example, this trend can be seen in the monthly base pay for an E-5 over six CYS in Figure 5. This upward trend in base pay is similar, but not precisely the same rate as inflation during the same time. Lawmakers can not ensure base pay increases are at exactly the same rate as inflation due to the timeframe of when the CPI-U is calculated. As mentioned in Chapter IV, CPI data is determined once the year has ended while base pay and sea pay are calculated and passed into law in the previous fiscal year through the

Defense Authorization Act. Also, there is a political aspect to military pay. When President George W. Bush took office in 2001, he made it a priority to increase the compensation of members of the armed forces at a higher rate than inflation. Consequently, a mid-year change in the military pay tables was enacted in June, 2001. With the wars in Afghanistan and Iraq, there was also an effort to improve military compensation, resulting in pay raises above the rate of inflation in 2002 and 2003.

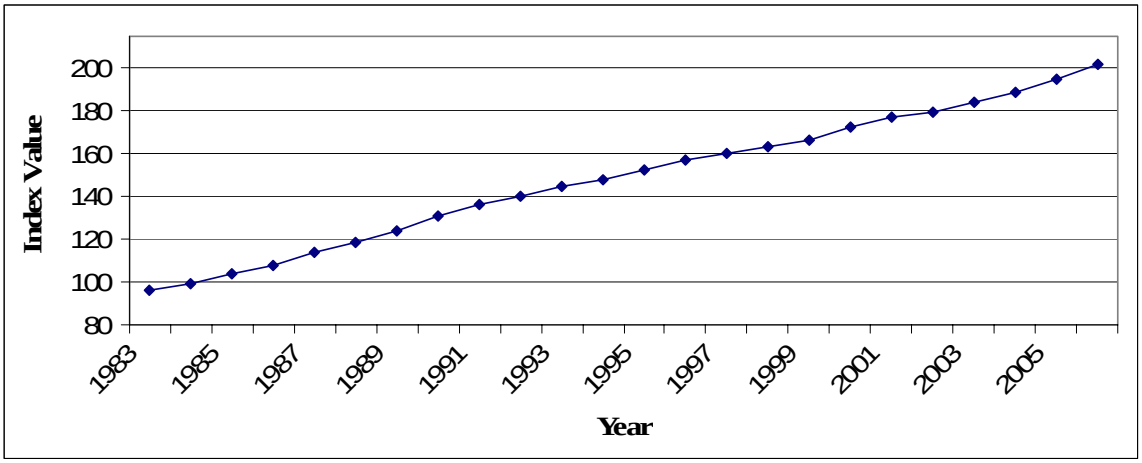

Figure 4. Yearly CPI-U (1983-2006)

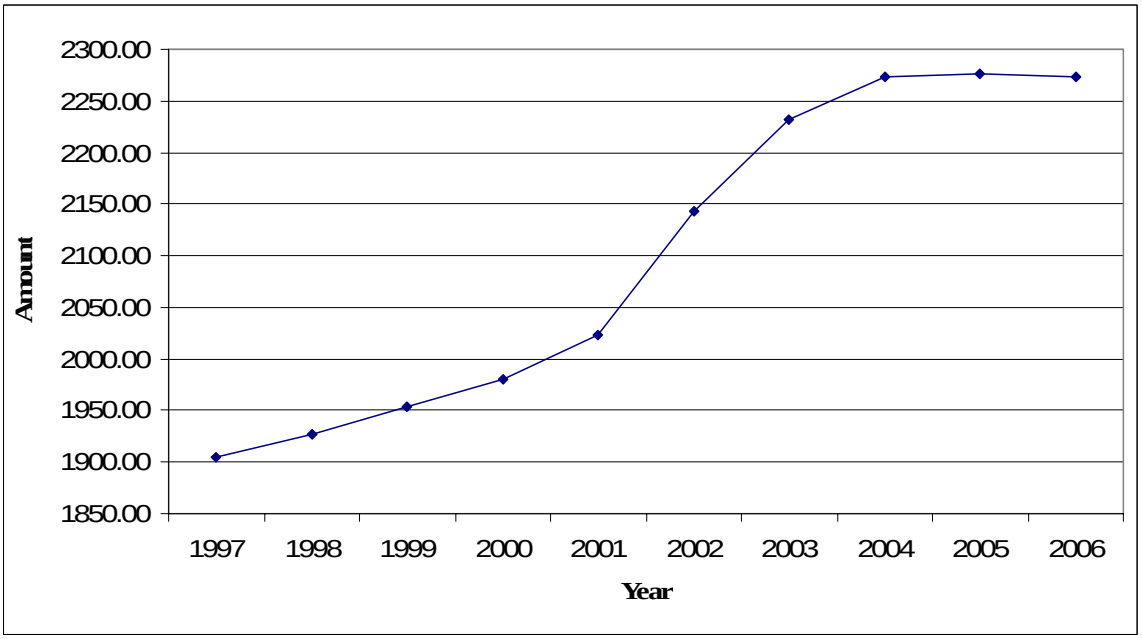

Figure 5. Monthly Base Pay for E-5 Over 6 CYS, 1997-2006 (2006 Dollars)

While base pay has had a yearly increase over the past ten years, there has not been a change in the Career Sea Pay program since October, 2001. Since that change, overall prices have risen 12 percent. This results in the continual decline in the purchasing power of CSP. The financial incentive in the form of a compensating wage that the CSP program offers Sailors to remain at sea-based commands will continue to diminish as the real value of CSP declines each year. Since the revision in sea pay in 1988, sea pay for an E-5 over five and six CYSD has remained unchanged as shown in Figure 6. Adjusted for inflation, this equals a reduction in purchasing power of 38 percent over an 18 year period. Figure 6 also illustrates the disparity among the different CYSD. From 1989 through 2001, there was a substantial incentive for an E-5 over four CYSD at the end of his PST to extend. By extending an extra year and achieving five CYSD, his sea pay increased by an average of $195 per month. The $195 may not seem large in absolute terms, but it accounts for an 85 percent increase in sea pay. However, the incentive to extend for an E-5 with five CYSD to achieve six CYSD is greatly reduced. The average increase is $13 per month.

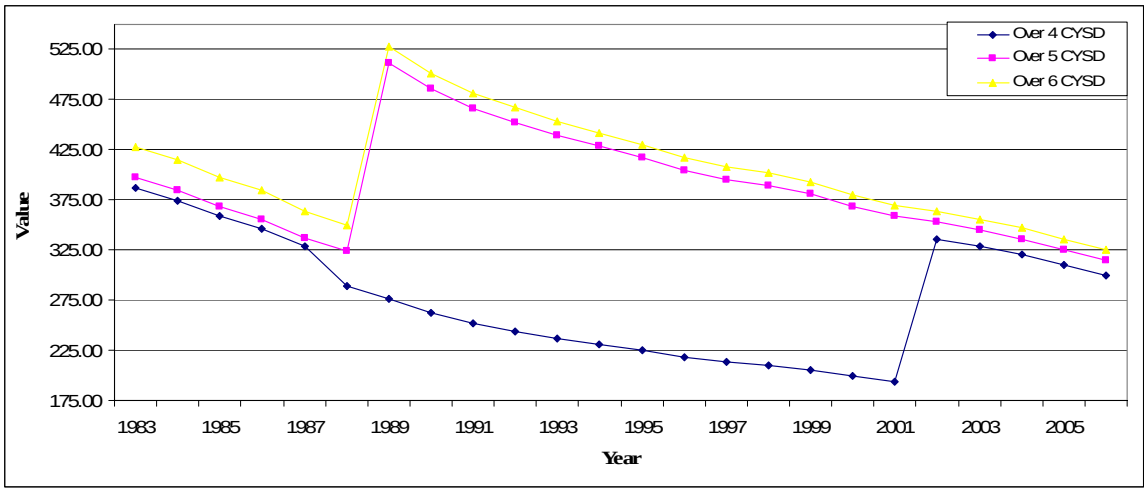

Figure 6. Sea Pay Comparison for an E-5 with Over 4, 5, and 6 CYSD (2006 Dollars)

Without an increase in sea pay for an E-5 over six CYSD in 18 years, the monthly purchasing power (in 2006 dollars) has dropped from $528 in 1989 to $325 in 2006, a 38 percent decrease. While this is a reduction of purchasing power of only $203, it also needs to be considered in relation to base pay. As shown in Figure 7, sea pay was 28

percent of base pay for an E-5 with six years of service in 1989. Since 1989, sea pay has steadily declined to a low of 14 percent of base pay in the most recent year, 2006. The change in payouts in the CSP program in 2001 did resolve the disparity for an E-5 over four CYSD, but it still did not address the steady decline in sea pay for an E-5 over five and six CYSD. Normalizing the value of sea pay in 2001 for the E-5 over four CYSD did have the effect of reducing the incentive to extend that had been present from 1989 through 2001. The trends described above for an E-5 are comparable for an E-4 as shown in Figure 8.

As the purchasing power of CSP declines, its value as an effective compensating wage similarly declines. If completing additional sea duty is a decision made at the margin, the marginal cost is the additional rigor and stress induced by performing sea duty as opposed to going to shore duty or exiting the Navy for the civilian sector. While this cost could decline in the future with quality-of-life and technological improvements, very few ships have experienced such changes over the past five years. "Smart ship" initiatives to reduce manning and improve automation of tasks are still in the testing stage of development. Additionally, only one new ship class (LPD 17) has entered the fleet since 2001. Thus, as the marginal benefit, namely CSP, is reduced by a loss of purchasing power, the number of personnel willing to perform sea duty is lowered with the loss in real benefit generated by the 2001 change in sea pay rates enacted in 2001. The following sections will use empirical analysis and statistical techniques to test whether the effectiveness of CSP has been affected by the loss in purchasing power.

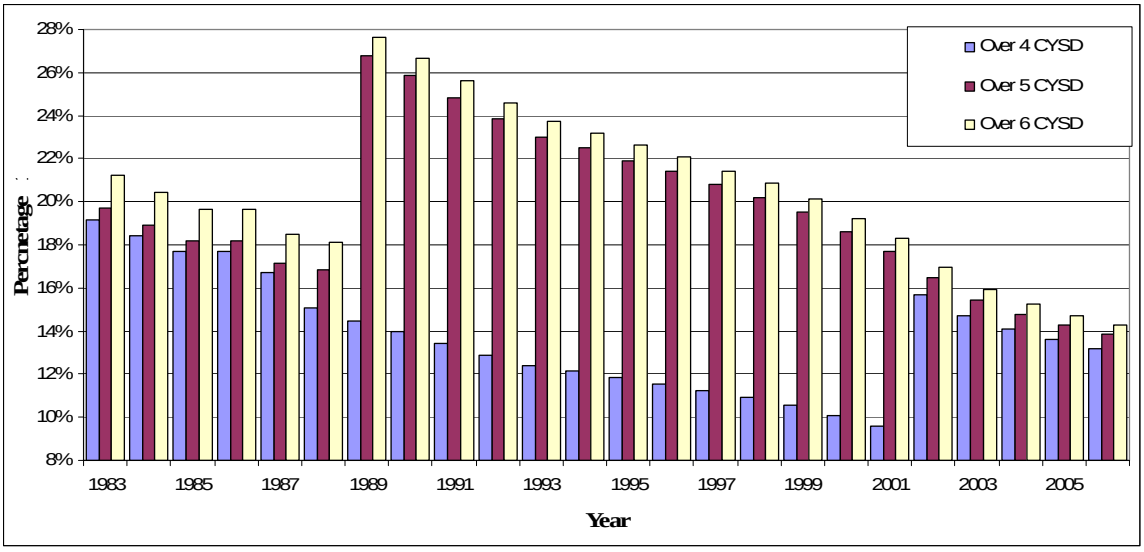

Figure 7. Sea Pay as a Percentage of Base Pay for an E-5 Over 6 CYSD (2006 Dollars)

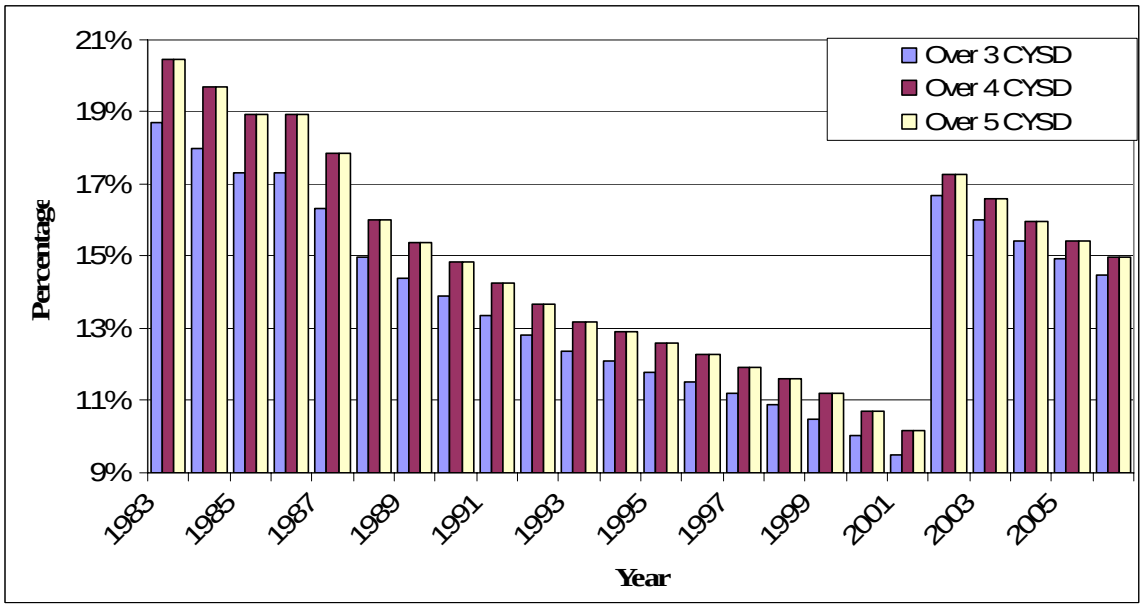

Figure 8. Sea Pay as a Percentage of Base Pay for an E-4 Over 4 CYSD (2006 Dollars)

2. Hourly Rate of Career Sea Pay

The previous section showed that the real value of CSP has declined both in absolute value and as a percentage of base pay since the last change to the CSP table at the beginning of fiscal year 2002. Another way to illustrate the value of CSP as a

compensating wage for the performance of sea duty is to calculate the hourly pay increase provided to Sailors. The hourly rate represents the premium the Navy assigns to the increased difficulty and stress of being at sea. Some compensating factors included in this premium are temporary separation from family and higher operational tempo requiring Sailors to stand rotating watches. Essentially, CSP is added pay meant to compensate for the added costs of performing sea duty.

The hourly wage rates presented in Table 9 represent CSP as compensation by dividing the value of CSP payments by the total additional hours the Navy expects Sailors to work at sea using a "best-case" scenario that was explained in Chapter IV. In summary, that scenario assumes that Sailors are underway 25 days each quarter at the end of the quarter and that they work the standard Navy workweek underway over a six-day week while earning an eight percent annual return on their CSP payments. Economic theory states that a product (in this case labor) will be supplied until (perceived) cost equals wage. Therefore, these hourly rates are indicative of the value the Navy assigns to the additional costs for Sailors performing sea duty. Although it is beyond the scope of this project to analyze individual preferences of Sailors, it is interesting to note that for the most junior personnel, the value of CSP is significantly less than the federal minimum wage of $5.15 per hour that has been in effect during the time period studied. The disparity in the value of the hourly wage between pay grade and seniority suggests that satisfaction with sea pay will likely increase over time as the benefits obtained from performing sea duty increase. Consequently, the benefit of CSP as an incentive to remain in a sea duty billet or remain in the Navy may not be significant, especially for those personnel completing their initial contractual obligation.

		Fiscal Year				
Pay Grade	Cumulative Sea Time (Years)	2002	2003	2004	2005	2006
E-1	<1	$1.19	$1.16	$1.13	$1.09	$1.06
E-2	<1	$1.19	$1.16	$1.13	$1.09	$1.06
	>2	$1.78	$1.74	$1.69	$1.64	$1.59
E-3	<1	$1.19	$1.16	$1.13	$1.09	$1.06
	>2	$2.37	$2.32	$2.26	$2.19	$2.12
E-4	2 to 4	$3.80	$3.71	$3.62	$3.50	$3.39
	4 to 8	$6.88	$6.73	$6.55	$6.34	$6.14
	>8	$9.25	$9.05	$8.81	$8.52	$8.26
E-5	4 to 5	$7.12	$6.96	$6.78	$6.56	$6.35
	6 to 7	$7.71	$7.54	$7.34	$7.10	$6.88
	>8	$10.68	$10.44	$10.17	$9.84	$9.53
E-6	6 to 7	$7.71	$7.54	$7.34	$7.10	$6.88
	9 to 11	$11.03	$10.79	$10.51	$10.16	$9.85
	16 to 18	$12.46	$12.18	$11.86	$11.48	$11.12
E-7	8 to 9	$11.63	$11.37	$11.07	$10.71	$10.38
	12 to 13	$12.34	$12.06	$11.75	$11.37	$11.01
	>16	$14.24	$13.92	$13.56	$13.12	$12.71
E-8	10 to 11	$11.87	$11.60	$11.30	$10.93	$10.59
	14 to 16	$13.64	$13.34	$12.99	$12.57	$12.18
	>18	$14.71	$14.38	$14.01	$13.55	$13.13
E-9	12 to 13	$12.34	$12.06	$11.75	$11.37	$11.01
	14 to 16	$14.71	$14.38	$14.01	$13.55	$13.13
	>16	$14.71	$14.38	$14.01	$13.55	$13.13

Table 9. Hourly CSP Compensation Rates (2006 Dollars)

C. EMPIRICAL ANALYSIS

1. ARGUS Career Milestone Tracking System Survey Responses

One useful measure of the effectiveness of CSP is the response to questions from the Navy's ARGUS Career Milestone Tracking System survey. As described in Chapter III, Sailors complete an online questionnaire at various career milestones. The responses indicate the influence of various quality-of-life and compensation issues on individuals' decision to stay in the Navy or exit. Respondents rate each issue on a scale of one to

seven, where one indicates a strong desire to leave the service, four indicates the issue has no effect on their decision, and seven indicates a strong desire to remain in the service. Due to ARGUS system limitations, data can be separated into only two time periods; yearly trends cannot be examined. The change over these two time periods is still of interest because it is possible to see the effect of increases in base pay and CSP as operational tempo increased after the commencement of Operation Iraqi Freedom. Each survey question from Table 6 of Chapter III is analyzed in the following paragraphs.

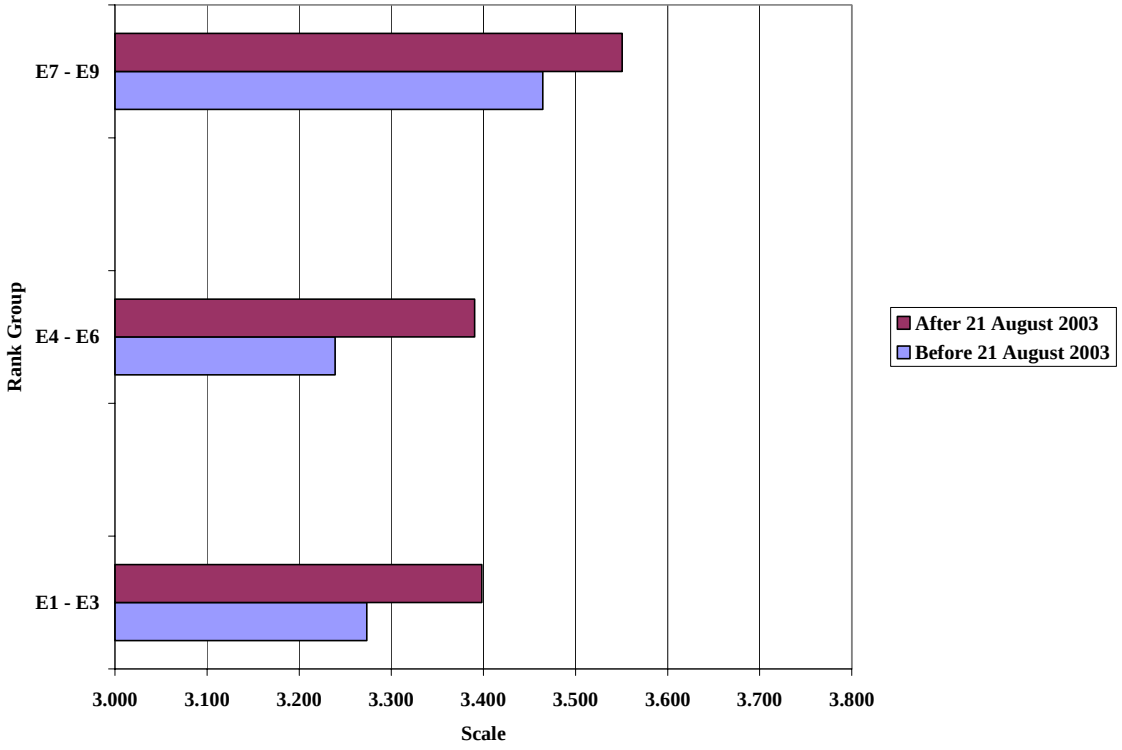

Figure 9. Satisfaction with the Number of Hours Put in at Sea to Get the Job Done

Figure 9 reports the results from of the ARGUS survey question response to the effect of the number of hours put in at sea to get the job done on retention over the two time periods. The hours required to get the job done at sea relates to quality-of-life and job satisfaction issues that will impact future career decisions. Hours worked while at sea are expected to be longer and more arduous than the hours worked in port or on shore duty. If CSP is an effective compensating wage, we would expect the results of this

question to be similar to the results of the question shown in Figure 10, the satisfaction with the number of hours put in while in port to get the job done.

In fact, the trends are reversed. For all pay grade groups, respondents indicate that the number of hours required is an influence to leave the Navy both while at sea and in port. While at sea, the satisfaction with hours worked increases with seniority while the opposite is true while in port. This is consistent with the analysis presented in Section B.2 of this chapter. The marginal benefit of CSP, even after the increase in fiscal year 2002, does not compensate for the perceived marginal cost of being at sea in the more junior pay grades. While the gap in satisfaction between hours at sea and hours in port for these junior personnel has reduced, it is likely to persist with the continued loss of CSP purchasing power combined with inflation adjusted base pay. If the gap did not close when the real value of CSP was at its maximum, as inflation continues to erode its real value, CSP will be unable to create equality between satisfaction at sea and satisfaction in port in the future. In the more senior pay grades, the value of CSP appears to better compensate for the additional work required while at sea.

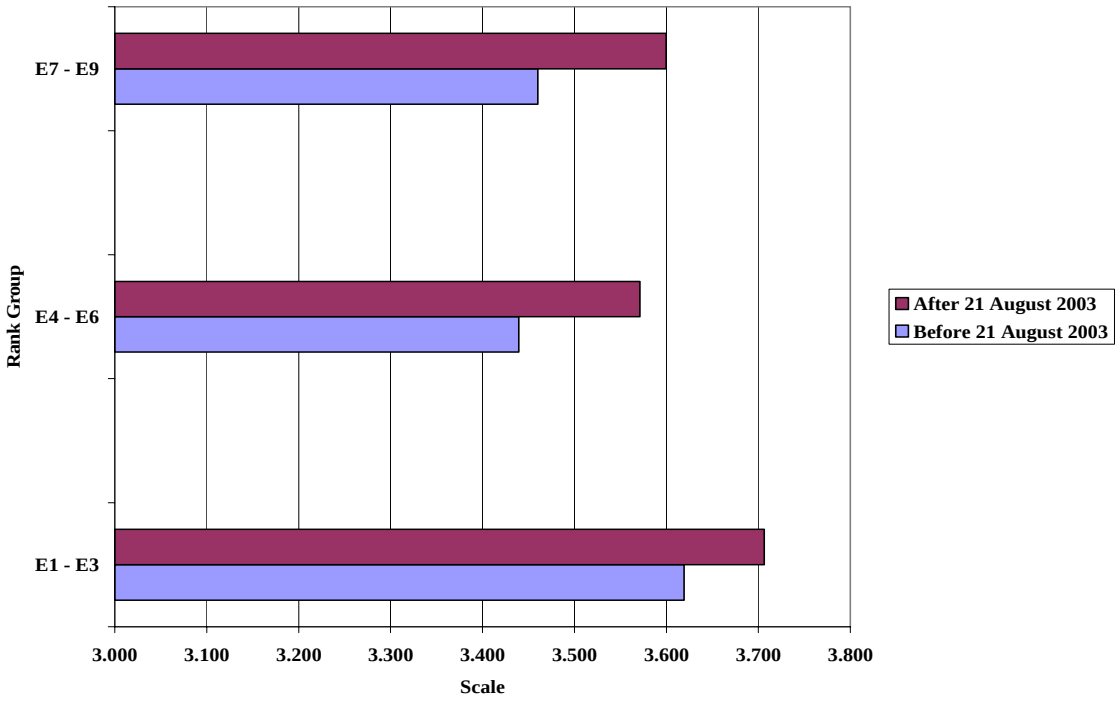

Figure 10. Satisfaction with the Number of Hours Put in While in Port to Get the Job Done

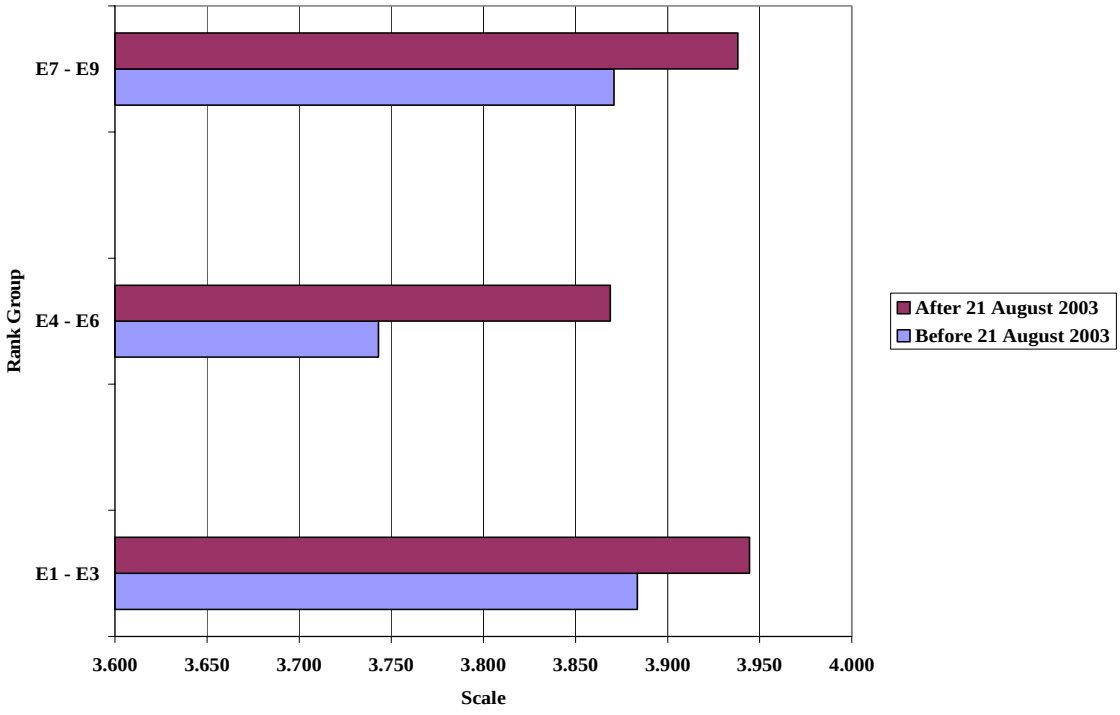

Figure 11. Satisfaction with the Number of Hours Put in on an Average Day to Get the Job Done

Figure 11 reports the results from of the ARGUS survey question response on the number of hours put in on an average day to get the job done over the two time periods. Respondents to this question include personnel serving both on sea duty and shore duty. The higher overall average value of the response to this question when compared to the responses in Figures 9 and 10 indicates that respondents on shore duty are more satisfied with the number of hours they work than their counterparts at sea. For CSP and CSPP to encourage extension of sea duty or back-to-back sea tours in lieu of going to shore duty, their combined value would have to compensate for this difference in satisfaction. The gap narrowed between the average values of the responses in Figure 9 compared to Figure 11 during the period after August 21, 2003. Based on these results, there may be a marginal effect for individuals that may have a preference for being at sea to extend their term at sea; however, analysis conducted for this project suggests that the perceived value of CSP and CSPP will have to increase to effectively encourage personnel to remain at

sea beyond their commitment. This analysis appears to be supported by the following examination of the change in Sailors' satisfaction with their compensation.

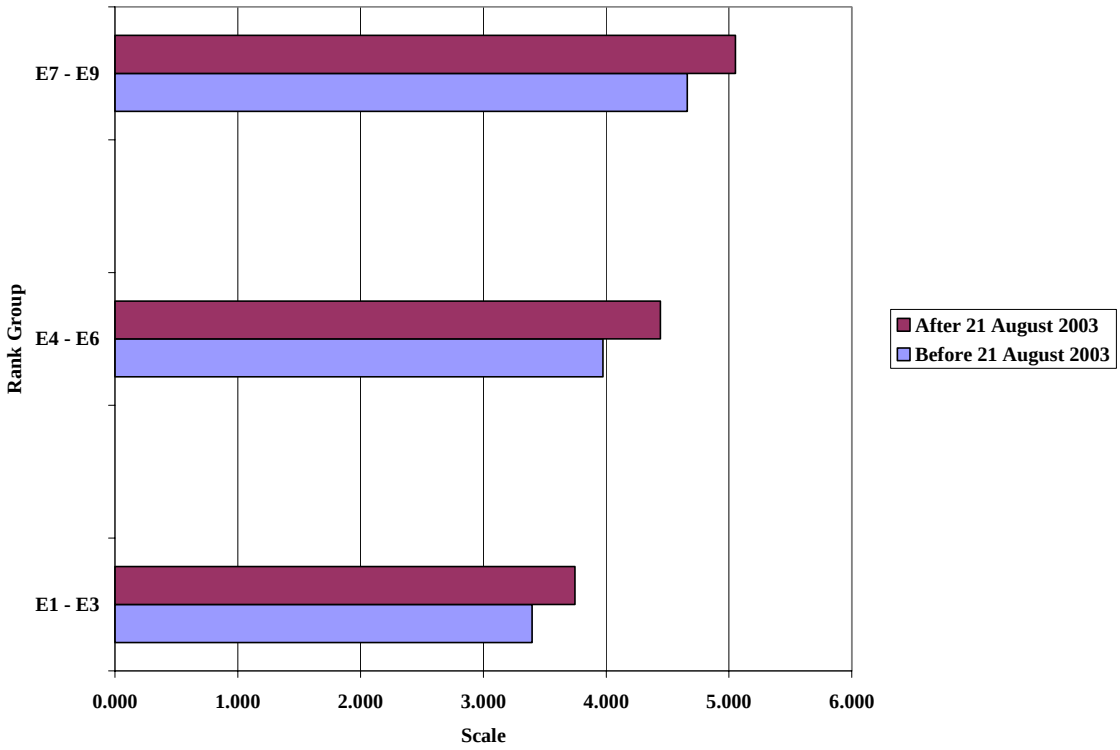

Figure 12. Satisfaction with the Amount of Pay Received

Figures 12, 13, and 14 show the average values of the influence of total pay, base pay, and sea pay, respectively, on the respondents' decision to remain in the Navy. Total pay includes all regular and special pays as well as benefits. For all pays over all pay grades, there was an increase in the level of satisfaction with compensation after August 21, 2003. For pay grades above E-4 in the second time period, all pays contributed to a desire to stay in the Navy. The fact that the level of satisfaction with a pay amount increases with its magnitude indicates the survey respondents were answering rationally from an economic perspective. As discussed in Chapter II, compensation expectations contribute to retention decisions. The more positive the level of satisfaction an individual has for amount of compensation, the greater the chance that individual will be retained. The change in the level of satisfaction over time suggests that compensation is becoming

more effective at encouraging retention. Comparing sea pay satisfaction with satisfaction with hours worked at sea reveals additional information.

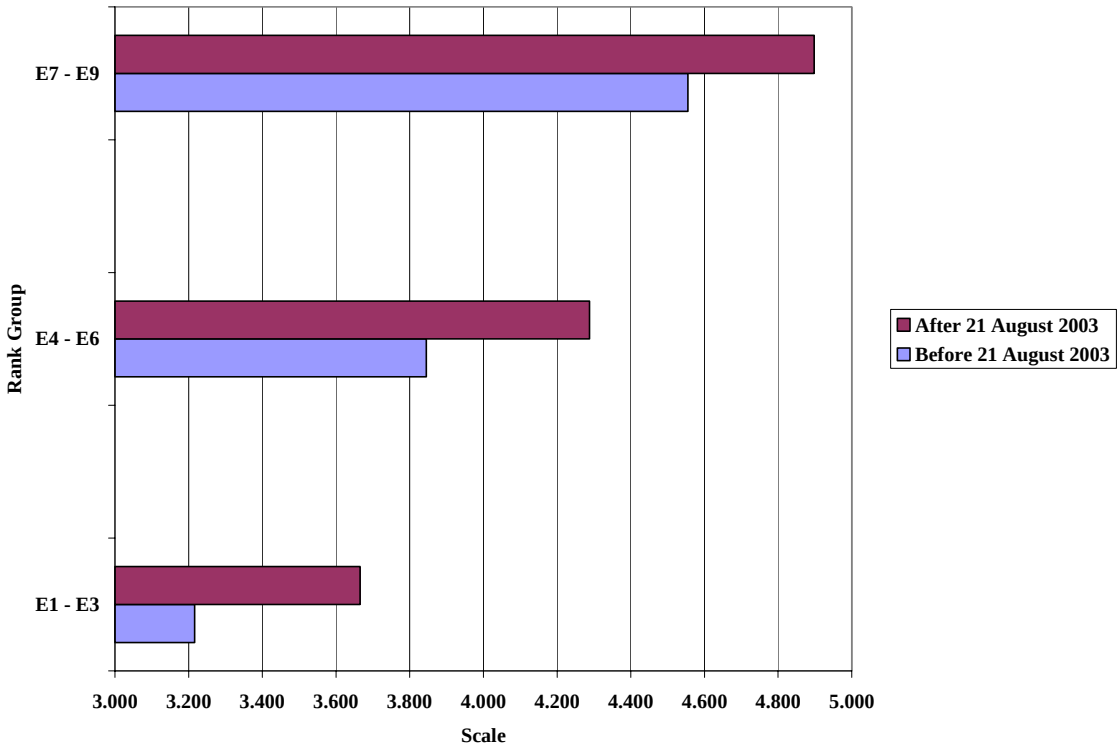

Figure 13. Satisfaction with the Amount Base Pay Received

For all pay grade groups, the respondents were more positive about the amount of sea pay they receive than the number of hours they have to work at sea to get the job done. Like the responses in Figure 9, the level of satisfaction with sea pay increases with seniority. Those in pay grades E-4 and above have been influenced to stay in the Navy by the amount of sea pay since August 21, 2003. This is encouraging since a pay should intuitively encourage personnel to remain in the Navy to be effective. The fiscal year 2002 increase in CSP was successful in achieving this criterion for personnel in pay grades above E-3. Yet, as discussed throughout this paper, the benefits of CSP that encourage retention should offset the negative influences of being at sea, i.e. the number of hours worked, for the pay to be effective. Comparing the satisfaction levels reported in Figure 9 and Figure 14, the only satisfaction scores that average to a value above 4.00, creating a net satisfaction with sea duty that makes a Sailor at least indifferent when

making a retention decision, is for those personnel in pay grades E-7 and above. For those in pay grades below E-7, while satisfaction in both the amount of sea pay received and the number of hours worked increased over the two time periods, the benefit created by the amount of pay is still not enough to offset one of the perceived costs incurred by sea duty. This suggests that CSP has not met its objective to compensate for the rigor of sea duty for a large segment of the enlisted community.

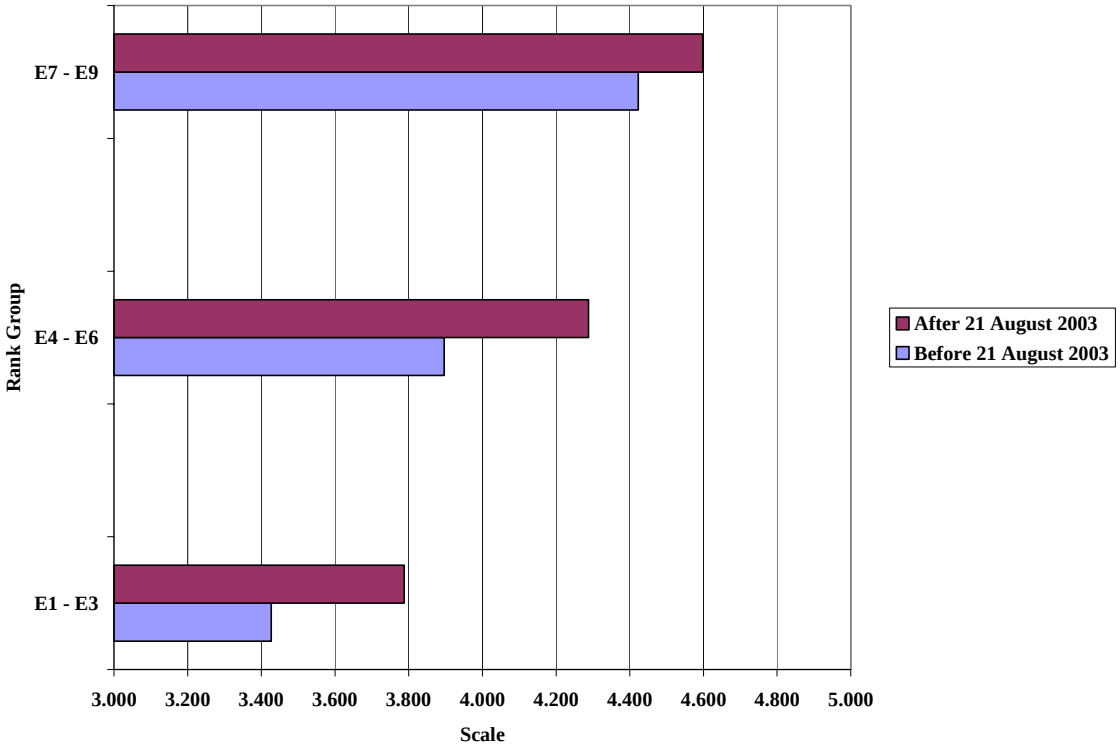

Figure 14. Satisfaction with the Amount of Sea Pay Received

2. Prescribed Sea Tours Completion Trend Analysis

The Military Personnel Manual (1306-116) defines a PST as a sea tour length designated for each community as promulgated by the most current sea/shore rotation NAVADMIN message. Normally, these sea tours do not exceed five years and most times must be at least three years in duration (Chief of Naval Personnel, 2007a). In Chapter II, it was suggested that one way to measure CSP program effectiveness over time is by looking at trend of the number of individuals who have exceeded their PST.

Remaining at sea is a voluntary action. The largest additional benefit to remaining at sea is the additional compensation from CSP. Comparing this to CSP payment amounts over time should indicate the influence of CSP on personnel performing sea duty and their willingness to remain at sea. The number of personnel who exceeded their PST for each of the five ratings of interest and Navy wide is analyzed below.

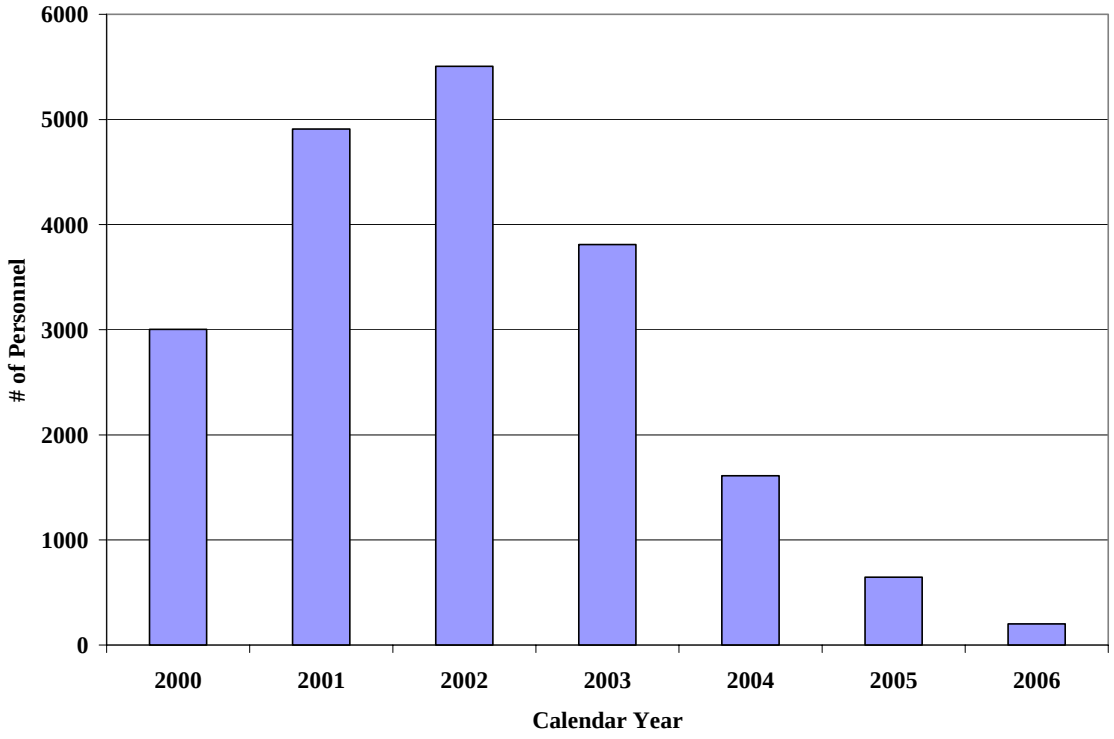

Figure 15. Personnel Exceeding PST 2000-2006 (Navy-wide)

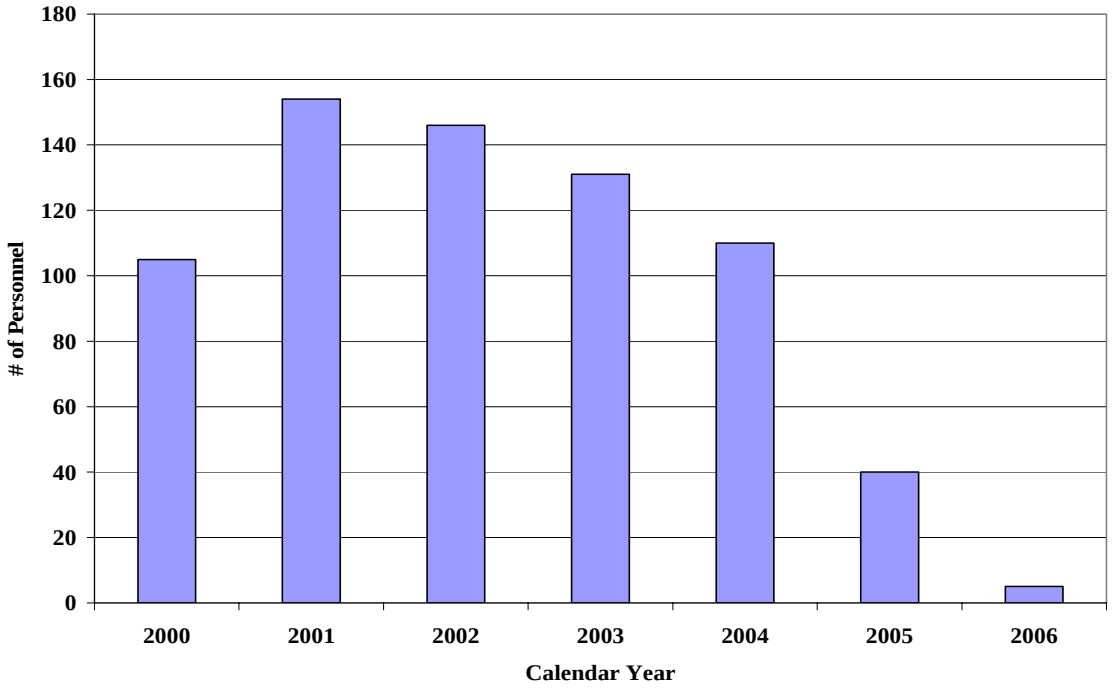

Figure 16. Personnel Exceeding PST 2000-2006 (BM Rating)

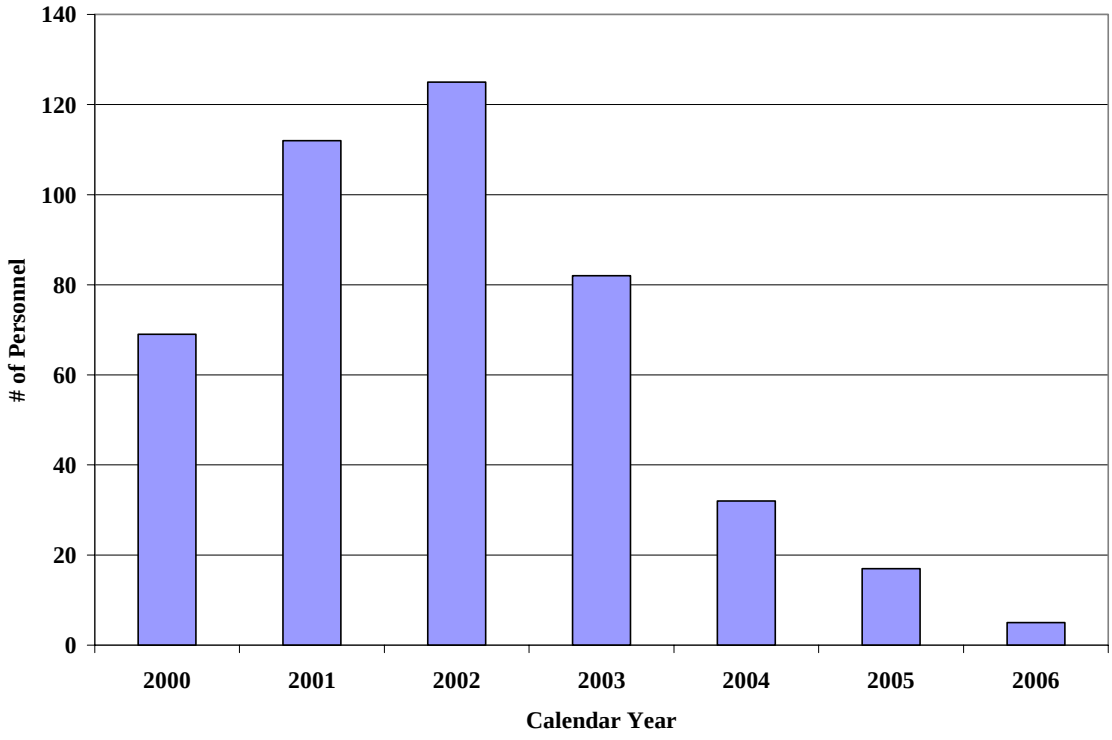

Figure 17. Personnel Exceeding PST 2000-2006 (FC Rating)

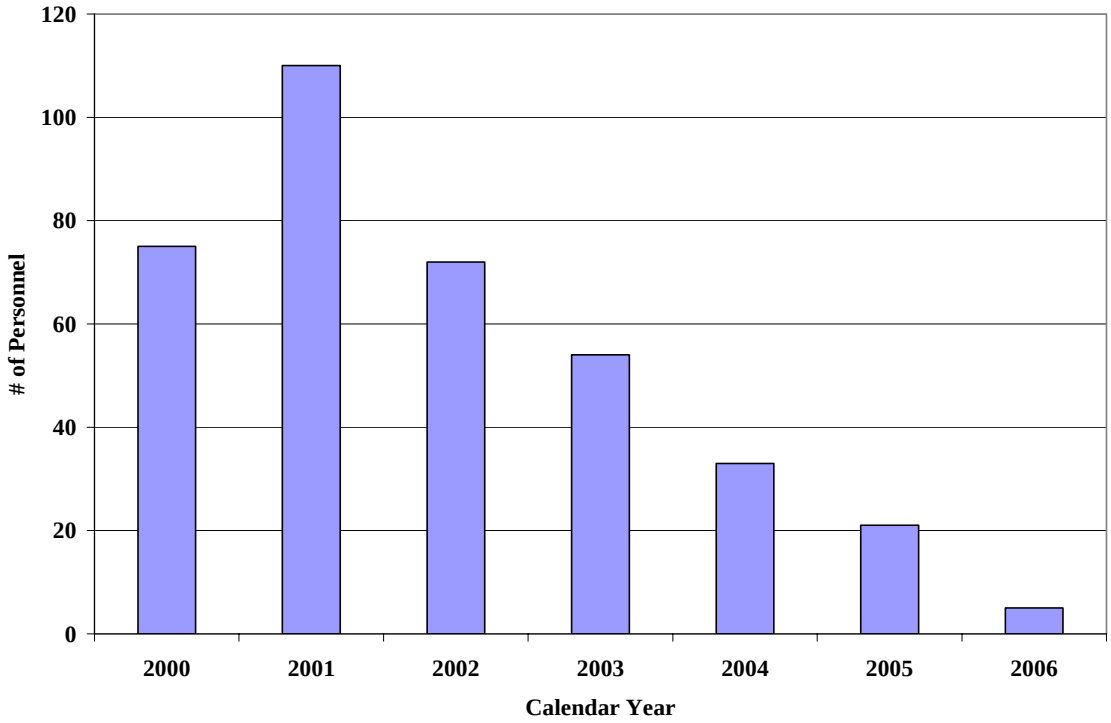

Figure 18. Personnel Exceeding PST 2000-2006 (OS Rating)

Figure 15 illustrates the trend of Navy wide enlisted members who have exceeded their PST. Figures 16 through 18 illustrate the trend of personnel in the three sea-intensive ratings (BM, FC, and OS) chosen for this project who exceeded their PST. All of the groups follow the same general pattern, suggesting that something affecting all of these ratings is causing this uni-modal trend. Similar to the pay trends in Figures 7 and 8, the number of personnel who exceeded their PST peaked during the calendar years 2001 and 2002. This peaking behavior result provides some evidence of a relationship between the purchasing power of CSP and the willingness of personnel to remain at sea beyond the required duration. As postulated above, the increase in the real value of CSP should have a marginal effect on the willingness of the enlisted population to stay at sea. For those at or near an indifference point, the increase in real compensation for sea duty will create an increasing net utility of performing that duty, inducing more people to volunteer to extend their time at sea. While this trend is like the one found by Golding and McArver (2002) after the increase in CSP in 1988, the rather rapid decline in the

number of personnel exceeding their PST after 2002 suggests other factors may have influenced the trend displayed in Figures 15 through 18.

Analysis of the effect of CSP on PST extension rates is hampered by external events that occurred contemporaneously to the increase in CSP rates. The terrorist attacks on the United States happened on September 11, 2001. The Navy, along with the other services and many agencies, increased their security requirements. Daily routines, work schedules, and unit operation tempos all increased temporarily to accommodate this new security environment. This may have prevented timely transfer of personnel assigned to operational ships as they were away from homeport supporting homeland defense. Another possible explanation is the increased sense of duty that personnel may have felt after the 2001 terrorist attacks. The increase in personnel exceeding their PST could be a result of individuals extending their sea tours out of a sense of patriotism and a desire to be deployed to a combat theater rather than a shore duty within the United States. These are likely additional explanations for the trends indicated in Figures 15 through 18. Without interview or survey data, these hypotheses cannot be tested.

Figure 19 illustrates the trend of personnel in the CTI rating who have exceeded their sea tour equivalent (typically a shore tour outside the continental United States). This rating can be treated as a control group to judge the influence of CSP on PST extension rates. The CTI rating does not have a sea-duty PST and personnel in that rating do not receive CSP while assigned to their equivalent sea tour, which is normally a shore tour outside the continental United States. It is therefore expected that the equivalent sea tour extension trend for the CTI rating will have little relationship to the trend in the real value of CSP over the period 2000 to 2006. It follows that if the distribution of CTI personnel exceeding their equivalent sea tour is similar to the trends exhibited by the sea-intensive ratings, CSP is not an explanatory cause for the trend in the sea-intensive ratings. The distribution of the number of personnel of the CTI rating who exceeded their PST is bi-modal, with peaks in 2000 and 2002. The sea-intensive ratings have uni-modal distributions similar to the Navy-wide distribution. The difference in distributions provides some evidence of an influence of CSP on the rate at which people exceed their PST; however, the small number of CTI personnel in the population makes drawing a

definite conclusion unwise. Except for the decrease of four people exceeding their sea-equivalent tour length in 2001, the trend is similar to that of the sea-intensive ratings.

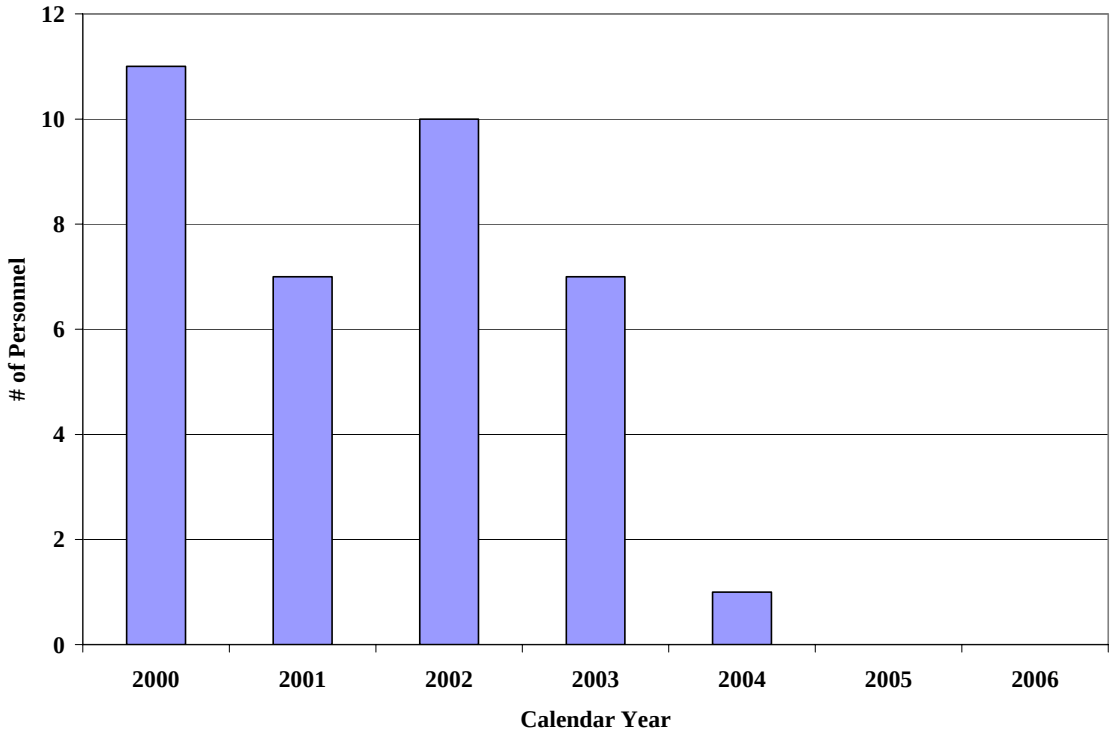

Figure 19. Personnel Exceeding Sea Tour Equivalent 2000-2006 (CTI Rating)

Figure 20 presents the trend of personnel in the MA rating who have exceeded their sea tour equivalent. For the MA rating, a sea tour equivalent is either a sea tour or an overseas shore tour. Since some of those in the MA rating were assigned to ships at the time of the CSP rate change, the project team hypothesizes that if CSP had an influence on willingness to exceed the PST, the MA trend should be similar to the sea-intensive ratings' trend. The number of personnel in the MA rating who exceeded their assigned sea tour peaked in 2002 calendar year and dropped to zero by 2004, which is similar to the trends in Figures 15 through 18. Thus, there is evidence to suggest a relationship between the value of CSP and the willingness to exceed the PST. It is also possible that the 2002 increase in the number of personnel exceeding the PST could be attributed to the Navy's increased security requirements after the September, 11, 2001, terrorist attacks, especially on ships and in overseas bases. As the Navy built the MA end

strength from 1,500 to 8,000 active personnel, Master-at-Arms already assigned to these locations may have remained to support the emerging force protection needs.

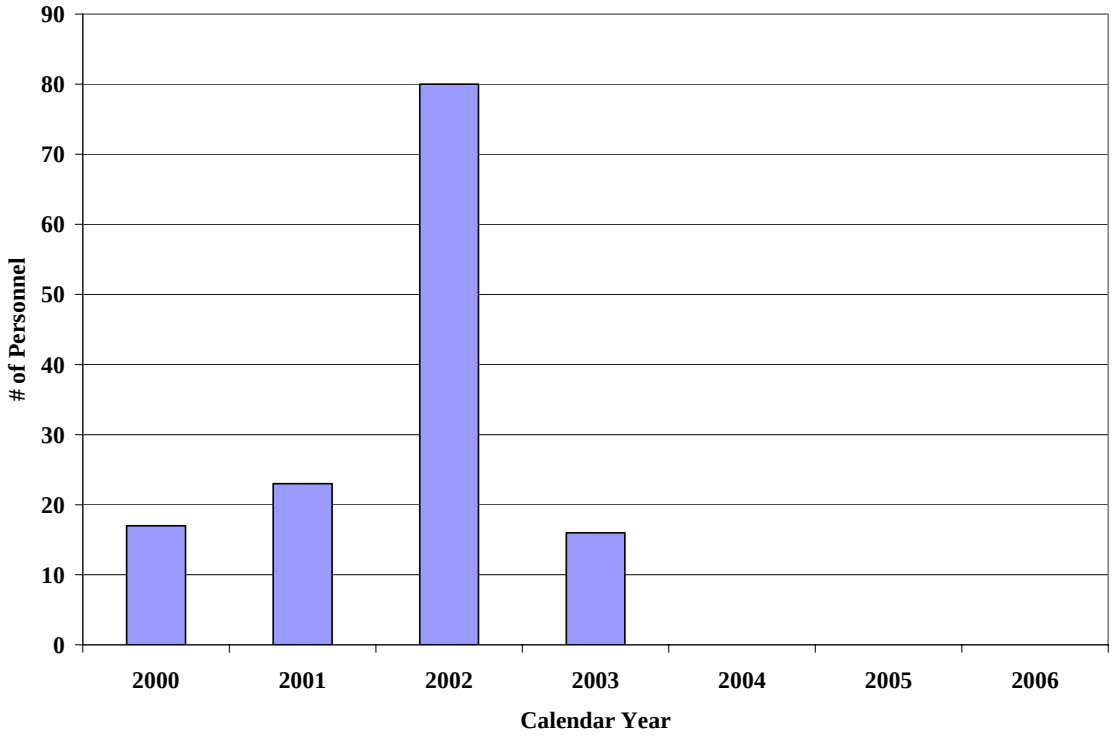

Figure 20. Personnel Exceeding Sea Tour Equivalent 2000-2006 (MA Rating)

3. Annual CSP and CSPP Costs Data Trend Analysis

Figure 21 shows the trend of CSP and CSPP payment amounts over a seven year period beginning with the year 2000. The most recent CSP and CSPP rate changes went into effect at the beginning of calendar year 2002. As explained in Chapter II, CSP is meant to efficiently target manpower dollars to improve the retention of personnel in sea-service skills. One way to verify its effectiveness is through an analysis comparing the number of personnel, by year, serving sea duty to the CSP payment amount trend. If CSP is effective at improving the retention of personnel in sea-service skills, it is expected that number of personnel serving sea duty should be consistent over the years.

Figure 22 is the trend, by percentage, of personnel serving sea duty for each of the five ratings of interest. Comparing the number of personnel serving sea duty to the yearly

CSP payment amounts, the percentage for most ratings is relatively consistent over the selected time period. The variation in the MA rating is a result of the large number of conversions and accessions of personnel to that rating as force protection requirements, particularly at shore-based facilities, were strengthened. For the sea-intensive ratings, the Navy was able to establish a 60 percent to 40 percent sea to shore ratio for the OS and BM ratings.

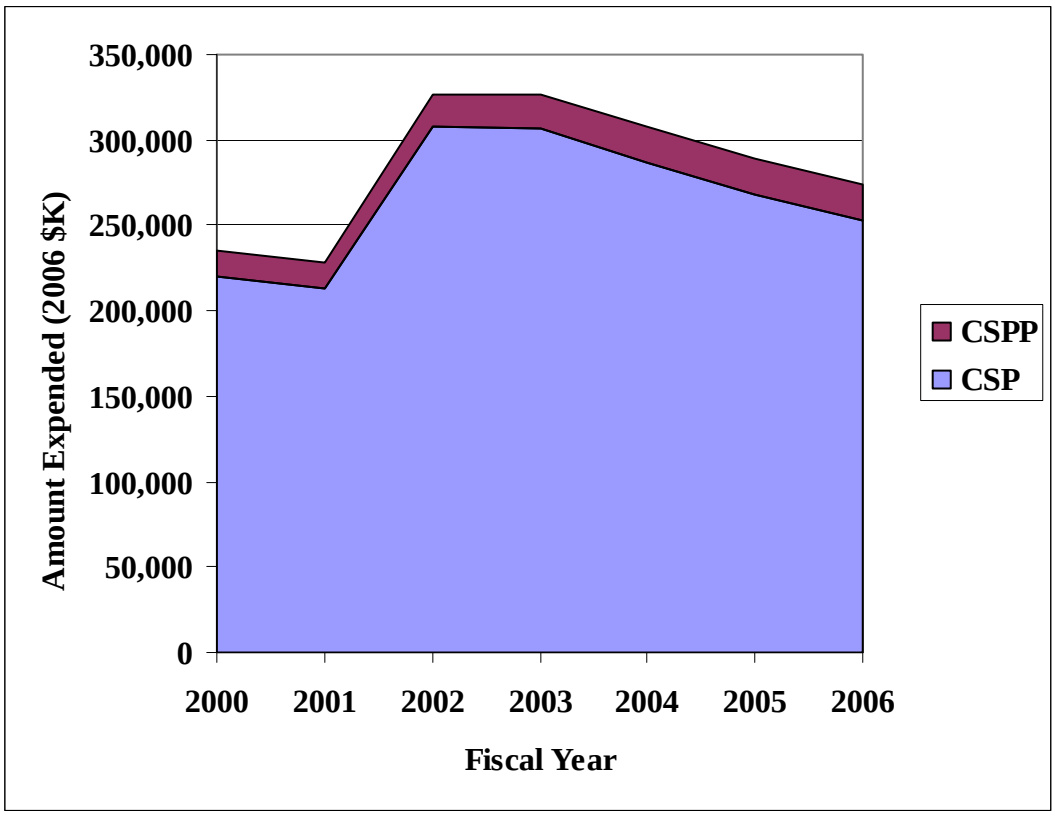

Figure 21. Annual CSP and CSPP Payment Amounts (2006 Dollars)

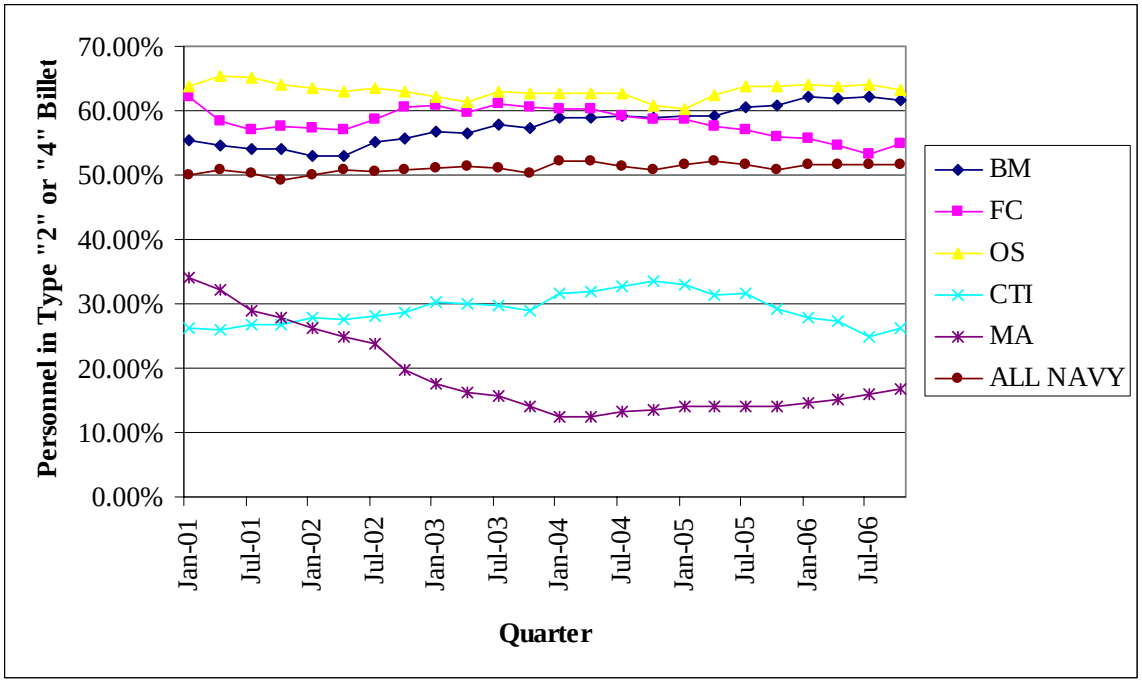

Figure 22. Sea Duty Trends of Five Selected Ratings of Interest.

The Navy has been unable to achieve that ratio for the FC rating. The percentage of those assigned to the FC rating declined from over 60 percent to approximately 55 percent over the period 2001 through 2006. This indicates that CSP and CSPP have been less effective at encouraging sea duty for this rating group. In response to this declining trend, the Navy recently started a pilot program to address the "at-sea manning challenges" of specific ratings, including the FC rating, by encouraging the voluntary extension of sea duty beyond the PST and the early return to sea duty from shore duty (Chief of Naval Personnel, 2007b). The program, called Sea Duty Incentive Pay, provides a lump sum payment based on a monthly rate of $500 to $700 per month extended past their PST or Project Rotation Date, whichever is later (Chief of Naval Personnel, 2007b). Given that these rates are higher than current CSP and CSPP rates for all but the most senior enlisted personnel, the implementation of this program supports our analysis that increasing the real value of CSP and CSPP has some influence on the performance of sea duty but that the 2002 increase in pay rates may have had only a

marginal and short-lived effect. The next section uses statistical analysis to support the empirical analysis and tests for a relationship that allows the Navy to determine the cost of an additional month of sea duty.

D. STATISTICAL ANALYSIS

1. Pooling Data Sets

Prior to measuring the relationship between various pays and the number of months of sea time generated by extension and reenlistment, the similarity of the project chosen ratings' populations is determined. Since the pays being examined are based on pay grade and various measures of service time, the mean and standard deviation of these parameters are calculated from a random sample as described in Chapter IV. The results from this sample are presented in Table 10.

While the mean pay grade of each rating is E-5, examining the mean service time shows a difference among the ratings. The average service time for the CTI, FC, and OS ratings are all under eight years while the MA and BM ratings are greater than eight years. The average Boatswain Mate has been in the Navy for close to 10.5 years. These differences suggest two differences among the ratings. First, a lower average service time with a similar average pay grade indicates that personnel within the CTI, FC, and OS ratings tend to advance faster than the other two. This may be due to the technical nature of these ratings. The skills personnel acquire in these ratings are likely more sought after in the civilian sector. That would generate a higher turnover, allowing for higher advancement rates. Second, the length of service for the BM rating when compared to other sea-intensive ratings indicates that there may be a selection bias by the personnel who choose to be Boatswain Mates. If the average Boatswain Mate serves for a longer period of time than those in ratings with similar sea-shore rotations, it may be because Sailors choosing to become Boatswain Mates do so because they enjoy life at sea. If this is true, they may be inclined to remain at sea regardless of the amount of incentives offered to them. This would also limit the opportunity of those in lower pay grades to advance since fewer Boatswain Mates are leaving the service. Although a

cursory inspection of the results in Table 10 reveals that the rating populations differ, a statistical pair-wise comparison of the parameter means is performed to verify the general results.

		Rating				
		BM	CTI	FC	MA	OS
Pay Grade (E-#)	Mean	5.202	5.01	5.008	4.908	4.872
	Std. Dev.	1.1593	1.1457	1.3445	1.5272	1.4765
Service Time (Months)	Mean	125.084	90.142	92.17	101.4	96.278
	Std. Dev.	75.9829	63.3320	70.2690	73.9751	75.8283

Table 10. Measures of Central Location and Variability for Pay Grade and Service Time

Table 11 shows the results of a test for inequality between the means of the pay grade and service time for samples from sets of two ratings. Since the authors' intent is to keep sea-intensive ratings and shore-intensive ratings separate to explore if CSP and CSPP have different levels of cost-effectiveness among those groups, sea-intensive ratings were not compared with shore-intensive ratings in this test. A p-value less than 0.1 indicates that there is sufficient evidence to conclude that the populations means are different. For this project to pool data sets from different ratings, the population means for both parameters need to be equal, indicating that the general composition of pay grade and service time is similar. Therefore, to conclude that the populations are similar, the p-values for both parameters being compared must be greater than 0.1. The only pair-wise comparison that meets this requirement is the FC-OS group. As discussed above, these ratings are similar in their technical level whereas the other groups are not. From this analysis, only the FC and OS rates can be analyzed as a group; the other ratings will be measured separately. The impact of this on future statistical analyses will be the large influence one data point can have on an entire data set given the small number of data points within each rating group.

	BM-FC		BM-OS		FC-OS		CTI-MA	
	Pay Grade	Service Time	Pay Grade	Service Time	Pay Grade	Service Time	Pay Grade	Service Time
t-Statistic	2.44361	7.11128	3.93088	6.00038	1.5229	0.88853	1.19468	-2.58504
p-Value	0.01472	2.2E-12	9.1E-05	2.8E-09	0.1281	0.37447	0.23252	0.00988
Equal Means?	NO	NO	NO	NO	YES	YES	YES	NO
Pool Data?	NO		NO		YES		NO	

Table 11. Statistical Determination of Similarity of Rating Populations

2. Spearman Rank Correlation Test Analysis

The first procedure this project uses to infer a statistical relationship between compensation from various additional and special pays and the creation of additional sea duty from retention is a non-parametric correlation technique. It is expected that any additional compensation available to an individual will have a positive influence on his or her desire to remain in the organization offering the compensation. The decision to remain will depend on whether the compensation offered adequately compensates the individual for the effort demanded by the job and on other external factors such as the availability of alternative employment and the impact on the individual's personal affairs. When multiple pays have a potential influence on a decision, one of the pays could be such an overwhelming influence as to overwhelm the effect of the others. For example, this project expects that selective reenlistment bonus payments would be the primary form of compensation influencing the reenlistment decision given that they are paid in large, lump sums and the SRB program is used by the Navy for the specific purpose of generating reenlistments. The Spearman rank correlation test measures two variables to determine if one has a linear relationship to the other. In this project, potential pays influencing the decision to extend or reenlist are correlated with the number of months of sea duty generated by a change in EAOS dates categorized as either an extension or a reenlistment. The results of this test are displayed in Table 12.

			Extension			Reenlistment			
		Months Generated vs.	CSP	CSPP	Advancement	CSP	CSPP	Advancement	SRB
BM	Spearman Coefficient		0.3	0	0.6	-0.9	-0.4	-0.8	0.8944
	P-Value (One-Tail)		0.2743	0.5	0.1151	0.0359	0.2119	0.0548	0.0368
	Significant Positive Relationship?		NO	NO	NO	NO	NO	NO	YES
FC & OS	Spearman Coefficient		-0.2848	0.1394	-0.7091	-0.0182	-0.2848	0.297	0.1515
	P-Value (One-Tail)		0.1964	0.3379	0.0167	0.4783	0.1964	0.1865	0.3247
	Significant Positive Relationship?		NO	NO	NO	NO	NO	NO	NO
CTI	Spearman Coefficient		0.8	N/A	0.8	0.5	N/A	0.9	-0.1
	P-Value (One-Tail)		0.0548	N/A	0.0548	0.1587	N/A	0.0359	0.4207
	Significant Positive Relationship?		YES	N/A	YES	NO	N/A	YES	NO
MA	Spearman Coefficient		0.8	0.8	-0.5	0.5	0.5	0.1	0.8
	P-Value (One-Tail)		0.0548	0.0548	0.1587	0.1587	0.1587	0.4207	0.0548
	Significant Positive Relationship?		YES	YES	NO	NO	NO	NO	YES

Table 12. Spearman Rank Correlation Test Results

Although there are very few relationships that exhibit a significantly positive relationship, there are trends which do give some credence to our hypotheses about the contribution of various pays to different retention decisions. With the exception of the FC and OS group for CSP and the BM rating for CSPP, CSP and CSPP both have a positive influence on the decision to extend on sea duty. While not significantly positive in the case of the BM rating, the small sample size and the effect of the assumption used to estimate the value of CSP and CSPP from 2002 to 2004 described in Chapter III possibly reduced the strength of the relationship. The number of months generated by extension (presented in Appendix B) declined each year from a high of 18,850 months in 2002 to a low of 12,284 months in 2006. This trend is consistent with the reduced real

value of CSP and CSPP over that period. For the FC and OS group, a rather sharp decline in the months of sea duty generated in both rating groups in fiscal year 2003 likely impacted the results of the correlation test due to its methodology. Since this happened in both ratings over the same time period the explanation for this result may be due to external factors.

In fiscal year 2003, the United States commenced operation Iraqi Freedom and the Navy began its Fleet Response Plan (FRP). The FRP increased the operational tempo of ships and created more irregular deployment schedules. For those in technical ratings such as OS and FC, these events may have encouraged them to seek alternative employment at the end of their contractual obligation. Given the increasingly robust U.S. economy the opportunities for employment in the civilian sector were clearly present. Removing the data from 2003 for these ratings illustrates the impact of that year on the correlation. The relationship between CSP and months of sea duty generated goes from negative to slightly, yet not significantly, positive, while the Spearman coefficient for CSPP becomes significantly positive. The positive effect of CSPP is expected since, as explained in Chapter II, this pay was implemented to encourage those in a sea duty billet to extend in order to continue to receive the payment. CSPP provides an additional expected income for remaining at sea since it is only paid to those serving 36 consecutive months at sea. For the shore-intensive ratings, the expected positive relationship is present and statistically significant. The strong positive relationship is noticeable, even with the small sample size, possibly because the individuals in these ratings do not typically expect to receive these pays. They are not eligible for CSP and CSPP when assigned to the shore billets that comprise the majority of their career. As a result, the impact of the additional pay could be a greater influence at a retention decision point than for those accustomed to receiving the pay.

The relationship between the additional pay expended to compensate those Sailors advanced while assigned to a sea duty billet and the months of sea duty generated by retention is not consistent, except for the CTI rating where the expected relationship exists. The likely source of error is with the decision by this project's authors to aggregate individual data. For a clear relationship to be evident, individuals eligible for

advancement and who expect to receive the additional pay provided by the promotion would have to be the same as those who are at a retention decision point in that year. Only in this case would the future expectation of higher pay resulting from the advancement be a determining influence in the retention decision. Due to the relatively few personnel in the CTI rating assigned to a sea duty billet, there is a greater chance of the personnel being advanced being the same as those reaching a retention decision point; therefore, the advancement pay differential has a greater influence on the retention decision and generates the expected positive relationship.

The expected positive relationship between months of sea duty generated by reenlistment and SRB appears to be present in only three of the four groups, and is only significantly positive for the BM and MA ratings. The relatively few data points make analysis problematic. Furthermore, the number of SRB offers taken compared to the average SRB amount presented in Table 13 does not show any particular positive trend. There appears to be a number of individual and external factors contributing to the acceptance of an SRB besides the amount of the SRB. This presents a particular difficulty for the Navy in meeting its retention goals if the cost-effectiveness cannot be readily determined.

	BM		FC		OS		CTI		MA	
Fiscal Year	# SRB	Avg SRB Amt. (2006$)	# SRB	Avg SRB Amt. (2006$)	# SRB	Avg SRB Amt. (2006$)	# SRB	Avg SRB Amt. (2006$)	# SRB	Avg SRB Amt. (2006$)
2002	0	$0.00	858	$17,466.72	599	$8,289.49	164	$15,642.44	441	$3,333.74
2003	0	$0.00	732	$12,414.45	735	$4,764.44	123	$15,182.02	767	$4,472.00
2004	0	$0.00	357	$12,797.85	808	$5,239.01	73	$14,796.92	1078	$7,575.88
2005	278	$5,001.37	641	$14,176.01	812	$5,480.04	78	$17,768.11	907	$8,390.64
2006	573	$4,261.89	839	$13,627.36	623	$5,088.40	128	$16,634.67	892	$8,162.01

Table 13. Summary of SRB Data by Rating 2002-2006

The results found using the Spearman correlation test are various and present no conclusive evidence as to the effectiveness of CSP and CSPP as a retention tool. While there is some indication that CSP and CSPP may provide an incentive to remain for short periods of time, there appears to be no support for sea pay encouraging Sailors to reenlist. The SRB program payments seem to be more effective at generating sea duty through

reenlistment, though it is clear from the data in Table 13 that the decision to reenlist is more than strictly a monetary one. The following section seeks to determine the cost of generating an additional month of sea duty for those pays showing a positive relationship to months of sea duty generated.

3. Simple Linear Regression Analysis

With the correlation between various forms of compensation and the additional sea duty generated determined, the linear regression model is used to determine the cost of each additional month generated for a particular payment method. For each pay that exhibited a significant positive linear relationship using the Spearman correlation test, a linear regression was performed using the method described in Chapter IV. The regression model provides a coefficient that relates the amount of money spent in a fiscal year for a particular pay to the number of months of sea duty generated in the same period. Two statistical measures are used to determine the significance of the coefficient and the explanatory power of the model: the p-value and the adjusted R-square. The adjusted R-square value indicates how much of the variability in the data is explained by the regression model. There is no specific acceptability level for this term, though the closer the value is to one, the more powerful the model is at explaining the data. The p-value will be used to determine if the model is acceptable. For the value of the coefficient to be valid, this project requires the p-value to be less than or equal to 0.1. The results of the simple linear regressions performed are summarized in Table 14.

		BM	CTI			MA		
	Category	Reenlist	Extend	Extend	Reenlist	Extend	Extend	Reenlist
	Independent Variable	SRB	CSP	Advancement	Advancement	CSP	CSPP	SRB
Intercept	Coefficient (Months)	8047.004	-5811.33	-422.8831	1431.5148	-5807.71	-3401.71	1064.933
	t-Stat	17.9825	-0.6727	-0.1451	3.89159	-1.0228	-0.79655	3.595481
	p-Value	0.00038	-0.1451	0.89383	0.03009	0.38169	0.483926	0.03688
Independent Variable	Coefficient (Months/$)	0.002363	0.208253	0.01988047	0.00319809	0.00652	0.188809	0.000286
	t-Stat	6.63615	1.0657	1.34778	1.71782	1.8724	1.94357	5.98509
	p-Value	0.00697	0.36472	0.27047	0.18433	0.15788	0.1472	0.00934
	Significant at 10% Level?	YES	NO	NO	NO	NO	NO	YES
Overall Model	F-Stat	0.00697	0.36472	0.27047	0.18433	0.15788	0.1472	0.00934
	Adjusted R Square	0.915	0.0328	0.1695	0.3278	0.3852	0.4098	0.897
	Cost to Generate Additional Month of Sea Duty	$423.20	$4.80	$50.30	$312.69	$153.38	$5.30	$3,491.53

Table 14. Linear Regression Results for Cost Parameters Exhibiting a Positive Relationship with Generated Months of Sea Duty

Of the seven regressions performed, only two generated models that had independent variable coefficients with p-values less than 0.1. These two modeled the relationship of SRB payments to months generated by reenlistment for the BM and MA ratings. From the adjusted R-square terms, both models explained a significant portion of the variability in the data. The BM model accounted for 91.5 percent of the variability while the MA model accounted for 89.7 percent of the data variability. Both models p-value indicate the coefficient of the SRB variable is significant at the ten percent level. By taking the inverse of the coefficient, the cost of generating one month of sea duty from the method can be estimated. For the BM rating, the cost of an additional month is $423.20, while the same month costs $3,491.53 for the MA rating. Analysis of the reason for the large difference is beyond the scope of this project; however, the amounts can be related to CSP and CSPP rates. CSP and CSPP rates are below the MA cost at all pay grades and CYSD levels and they are below the BM cost for pay grades and CYSD levels of personnel likely making their first reenlistment decision (junior seamen and third-class petty officers). Furthermore, the cost estimated for the BM rating is close to the proposed value of $500 to $700 per month proposed by the Navy in its pilot Sea Duty

Incentive Pay program (Chief of Naval Operations, 2007). This provides evidence that CSP and CSPP in its current form are not cost-effective if they are expected to serve as a reenlistment incentive.

The results of these models confirm that there are a number of external factors that influence the retention decision. Money is certainly a component, but other non-pecuniary items contribute to the retention decision. CSP and CSPP will not impact long-term retention decisions, but they may have limited effectiveness for short-term extensions while personnel consider their future career path. Although the regression for the relationship of CSP and CSPP to months generated by extension for the MA rating do not meet this project's acceptance criteria, the value of the coefficients provide some information. The CSP cost of $153.38 per month and the CSPP cost of $5.30 per month are illustrative of the magnitude of the marginal benefit a person requires to extend. This amount is potentially feasible, as indicated by the implementation of the Sea Duty Incentive Program, if the Navy requires a short-term force shaping tool.

E. CHAPTER SUMMARY

This chapter merges the various data collected throughout this project to perform a multi-level analysis of the effect and influence of the fiscal year 2002 change in the CSP program. An analysis of the trend in real value of CSP using CPI inflation data reveals a decline in the purchasing power of the special pay. This value represents the marginal benefit received by a Sailor performing sea duty. The marginal cost to the Sailor is the value of the extra effort required to perform the additional chores necessary at sea. Empirical analysis of ARGUS survey results and extension of PST trends provides some evidence that the recent increase in CSP had a positive effect on both the level of satisfaction with CSP and the willingness to remain at sea beyond the prescribed tour length. This positive effect was short-lived as the marginal benefit of the CSP increase was eroded to a point below the marginal cost by inflation. Statistical analysis reveals that CSP and CSPP have a much more limited effect on retention. While there is some indication of a positive relationship between the pays and the willingness to extend for short periods, the effect is rating-specific and more significant for the shore-intensive

ratings studied. Other targeted pays, such as the Selective Reenlistment Bonus, appear to be better at encouraging retention. Statistical analysis failed to reveal the value Sailors place on their time at sea. This may be a result of the size of the sample used in this project or the nature of the individual preferences of Sailors that could not be measured by an aggregate analysis. Chapter VI discusses the implications of these results and proposes modifications to the CSP program that will enable it to satisfy its stated intent.

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VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

This project's authors intended to determine if the enlisted component of the Navy CSP program is effective at meeting its primary objective of adequately compensating Sailors for the unique and arduous nature of sea duty service. To be effective, the authors hypothesized that a positive correlation between a change in the real value of CSP expenditures and the attitudes of enlisted Sailors toward performing sea duty would exist. To find the presence of a correlation, various sources of data were examined using numerous forms of analysis. First, the historical trends in the real dollar value of sea pay were presented to demonstrate the effect of inflation on the purchasing power of the pay. Second, an empirical analysis of survey data and sea tour extension rates was conducted to infer the response of Sailors to the change in sea pay value. Finally, a statistical analysis was undertaken to determine if various forms of compensation have any relationship to the generation of sea duty through extension or reenlistment, indicating the effectiveness of a secondary objective of the program to serve as a force-shaping tool. The results lead this project's authors to conclude that empirical evidence suggests that the increase in CSP rates in fiscal year 2002 generated an increase in the willingness to go to sea; however, the increase was short-lived due to the loss in the real value of the compensation due to inflation. Additionally, statistical analysis does not consistently verify the relationship between the cost and the intended secondary benefit of CSP and is unable to determine individual value of the cost of sea duty. These results raise questions about whether the current structure of the CSP program is effective at accomplishing its stated objectives.

The structure of CSP is similar to base pay in all but one regard. Like base pay rates, CSP rates increase with seniority both in terms of rank and time served in the respective duty. Unlike base pay rates, however, CSP rates are not adjusted annually to account for the effect of inflation. Since CSP is meant to function as a compensating wage, it should provide a benefit to a Sailor equal to his or her perceived cost of

performing duties required at sea. If the benefit is equal or greater than the cost, the willingness to perform sea duty should increase. Previous studies indicate such willingness can be measured by the change in the rate of Sailors staying in a sea duty billet beyond their ordered tour length. The data in this project establishes that the increase in CSP for fiscal year 2002 produced an increase in the rate at which Sailors exceeded their prescribed sea tour (PST). Yet, just like the trend in the real value of CSP since then, the rate at which Sailors exceeded their PST declined. The inability of CSP to sustain a marginal benefit equal to compensating for the marginal cost of sea duty is a sign that the program is ineffective in its current form.

Another indication of the ineffectiveness of CSP was found through a review of responses by Sailors to questions about quality-of-life issues including their satisfaction with the number of hours they work and the amount of various pays. Comparing these responses provides evidence of the efficacy of CSP as a wage compensating for the rigor of sea duty. For all pay grade groups, the respondents were more positive about the amount of sea pay they receive than the number of hours they have to work at sea to get the job done. Though the trends are similar for both questions in that the degree of satisfaction improves with seniority, those above the E-4 pay grade responded that sea pay was an influence to stay in the Navy while the number of hours required at sea was an influence to leave. Since working hours are one of the more unpleasant job characteristics, the survey results indicate that personnel are apparently not associating sea pay with its intended purpose of compensating for the hours of work required at sea. Presumably, an individual that feels sea pay is a positive influence would feel that he or she is being compensated for the time spent working at sea. If effective, the hours of work required at sea should be less of an influence to leave the Navy. This therefore suggests that CSP is not cost effective at increasing Sailors' satisfaction with sea duty.

A second indication of the disconnect Sailors perceive between the cost of sea duty and the benefit of CSP is the satisfaction with hours worked at port and at sea. If CSP is an effective compensating wage, this project would expect the survey results of the questions concerning hours put in while at sea or in port to be similar. For all pay grade groups, respondents indicate that the number of hours required is an influence to

leave the Navy both while at sea and in port. While at sea, the satisfaction with hours worked increases with seniority while the opposite is true while in port. The fact that the trends are reversed indicates the marginal benefit of CSP, even after the increase in fiscal year 2002, does not compensate for the perceived marginal cost of being at sea in the more junior pay grades. This is supported by the hourly wage calculations that show the compensation for sea duty provided by CSP is less than the federal minimum wage for junior enlisted personnel. While the trend is improving, the gap in satisfaction between hours at sea and hours in port for these junior personnel is likely to persist with the continued loss of CSP purchasing power combined with CSP being a smaller percentage of base pay. In the more senior pay grades, the value of CSP appears to better compensate for the additional work required while at sea, but satisfaction at sea is still not equal to satisfaction while in port. Incentives like CSP are more effective when they can be tied directly to the activity they are compensating. CSP is paid to any Sailor attached to a deployable ship, whether or not it is underway. By not paying CSP to Sailors only when their ship is underway, the Navy obscures the reason the pay is provided and arguably reduces its effectiveness.

The statistical analysis conducted in this project shows that CSPP, which is the portion of the CSP program designed to act as an incentive to encourage retention, has limited effectiveness for some ratings. While there is a positive relationship between CSPP and months generated by an EAOS change, especially for extensions less than 36 months, linear regressions provide no significant evidence of the value Sailors assign to this compensation.

In contrast, for SRB payments, a significant positive relationship between the amount paid and the months generated as well as a significant regression coefficient is found. SRB payments are targeted to specific ratings and ranks within those ratings to achieve the desired manning levels required whereas CSPP is a flat rate paid to any Sailor completing 36 consecutive months or more at sea. Additionally, CSPP suffers from the same loss in real value over time since the amount the Navy offers does not change annually. As discussed in Chapter II, retention decisions are made based on the value an individual assigns to the factors influencing the retention decision. Targeted pays like

SRB in these cases appear to be more effective at encouraging retention than do pays like CSPP, a conclusion reached by sea pay studies conducted in the late 1990's. For this reason, the project team concludes that the Navy's efforts at implementing a Sea Duty Incentive Pay program that provide lump-sum payments to specific ratings facing sea-duty shortfalls will be more effective at generating retention than will CSPP in its current form. The Navy's decision to pursue such a program supports our conclusions regarding the effectiveness of the CSP program and the need to align the program's structure to reestablish a useful cost-benefit relationship.

B. RECOMMENDATIONS

To address the structural flaws in the current CSP program indicated by this project's analysis, two changes to OPNAV Instruction 7220.14 are proposed to increase cost-effectiveness. First, tie the cost of sea duty directly to the benefit provided by CSP. CSP should be paid only to Sailors while the ship they are assigned to is away from its homeport. While the ship is in its homeport or in a shipyard, the Sailor would be ineligible for CSP since the burdens experienced at sea are not present and the Navy does not expect additional hours to be worked in port. To ensure incentives still exist among pay grades, it would be beneficial that the current sea counter tracking system remain in place. Therefore, sea service time will still accumulate for Sailors regardless of whether their ship is at sea, in a shipyard, or in its homeport. Sailors would still accumulate time on their sea duty counter and while they are at sea get paid the prorated amount for their associated rank and CYSD. This change would result in immediate savings in CSP funds; however the effectiveness will only improve from this change if the savings are reapplied to augment the current CSP pay rates. The CSP rates should be set equal to their real value when increased for fiscal year 2002. The rates must then be increased at the same annual rate as the yearly percentage change in base pay. Without a yearly adjustment for inflation, the recommended system will encounter the same trend which has occurred since the last change in CSP. A guaranteed yearly increase ensures the real dollar value of the program would remain relatively constant.

The second proposed change to the Career Sea Pay instruction, OPNAV Instruction 7220.14, is to revamp the CSPP portion of the program. This requires eliminating the current premium payment with a targeted premium focused on ratings which the Navy is having difficulty filling the necessary sea duty billets. The new premium would be similar to the Sea Duty Incentive Pay program currently in its pilot phase. The one hundred dollar per month premium has been unchanged since implemented in 1989, so the real value of this premium is 37 percent less today than at the time of its inception. In addition, by offering the same premium to all personnel regardless of rank or preference for sea duty, the effectiveness of the pay's ability to encourage retention is limited. The incentive plan currently being tested by the Navy addresses many of the concerns in the previous studies reviewed in this project regarding incentive pays by directly relating the cost incurred by the program to the benefits received by the Navy in the form of additional months of sea duty. This will be more cost-effective for the Navy in the long-run.

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APPENDIX A: SUMMARY OF SEA PAY LEGISLATION[1]

Act of March 3, 1835, ch. 27, §1, 4 Stat. 755, 755-757 (1835)

- First form of sea pay as it is understood today.
- Established pay rates for officers that included within grade differentials linked to duty status.

Act of June 1, 1860, ch. 67, §1, 12 Stat. 23, 24 (1860)

- Recognized length of cumulative sea time as a pay factor in some officer grades.
- Prescribed pay steps based on length of sea duty for the grades of Lieutenant, Boatswain, Gunner, Carpenter, and Sailmaker.

Act of March 3, 1899, ch. 413, §13, 30 Stat. 1004, 1007 (1899)

- Established differential rates for sea and shore duty. Army officers were the benchmark.
    - Navy officers ashore received 15 percent less than Army officers.
    - Navy officers at sea received pay equal to comparable Army officers.

Act of May 13, 1908, ch. 166 [Public Law 115, 60th Congress], §1, 35 Stat. 127, 127-128 (1908)

- Set pay rates for officers based strictly on grade and length of service, ending 73-year period of duty status differentials.
- Established a new special pay for officers assigned to sea equal to 10 percent of base pay while performing such duty. Sea duty pay considered to be "extra" compensation.

Act of June 22, 1922, (Joint Service Pay Readjustment Act of 1922) ch. 212, [Public Law 235, 67th Congress], §2, 42 Stat. 625, 627 (1922)

- Repealed the 10 percent provision for sea duty established in 1908.

[1] Unless otherwise indicated, all data were provided by the Sixth Edition of Military Compensation and Background Papers: Compensation Elements and Related Manpower Cost Items: Their Purposes and Legislative Backgrounds, published in May 2005 by the Office of the Secretary of Defense, Department of Defense.

The Act of March 7, 1942, ch. 166 [Public Law 490, 77th Congress], §18, 56 Stat. 143, 148 (1942)

- Restored sea duty pay provision as a wartime measure and for the first time included enlisted personnel within its scope.
    - Provided commissioned officers an additional 10 percent of base pay.
    - Provided warrant officers and enlisted personnel an additional 20 percent of base pay.

Pay Readjustment Act of 1942, ch. 413 [Public Law 607, 77th Congress], §2, 56 Stat. 359, 360 (1942)

- Made sea pay permanent.

Hook Commission in 1948

- First study of military compensation since 1908.
- Recommended abolishing sea pay for officers and modifying sea pay for enlisted personnel.

Career Compensation Act of 1949, ch. 681 [Public Law 351, 81st Congress], §206, 63 Stat. 802, 811 (1949)

- Enacted in response to Hook Commission of 1948
    - Eliminated sea duty pay for officers.
    - Established enlisted personnel sea pay rates ranging from $8 to $22.50 per month.

Department of Defense Appropriation Authorization Act, 1979, Public Law 95-485, §804(a)(1), 92 Stat. 1611, 1620-1621 (1978)

- Entitled any enlisted member of a uniformed service in pay grade E-4 or above who had served more than three years on "sea duty" to "career sea pay."
    - Set rates that ranged from a low of $25 a month to a high of $100 a month.
- Initiated cumulative-years-of-sea-duty categories
    - 1979 and 1980: three categories – over three years, over five years, and over twelve.
    - 1981: four categories - over three years, over five years, over seven years, and over twelve.
    - 1982: seven categories - - over three years, over five years, over seven years, over nine years, over ten years, over eleven years, and over twelve.

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Military Personnel and Compensation Amendments of 1980, Public Law 96-343, §3(a), 94 Stat. 1123, 1124 (1980)

- Increased rates set to become effective in October 1, 1981 by 15 percent and made them effective a year earlier.
    - Targeted petty officers with six to twelve years of service due to a shortage in these personnel.

Military Pay and Allowances Benefits Act of 1980, Public Law 96-579, §4(a), 94 Stat. 3359, 3364-3366 (1980)

- Made commissioned officers, except those in pay grades O-1 and O-2 without four years of active service as either an enlisted person or a noncommissioned warrant officer, to Career Sea Pay (CSP).
    - Amount of pay still depended on pay grade and cumulative years of sea duty.
- Established the Career Sea Pay Premium (CSPP).
    - Entitled payment of an additional $100 a month to any member of the uniformed service for each subsequent month serving on sea duty past 36 consecutive months.
- Expanded CSP to not only those personnel assigned to ships, but to those assigned to either a ship-based staff or ship-based aviation unit when embarked on a ship underway.

Uniformed Services Pay Act of 1981, Public Law 97-60, §116, 95 Stat. 989, 996 (1981)

- Made CSP available to members of the "off-crew" of a two crew submarine.

Department of Defense Authorization Act, 1985, Public Law 98-525, §623(a), 98 Stat. 2492, 2541 (1984)

- Increased pay rates for enlisted members in the pay grades E-6 to E-9.
- Added four more cumulative-years-of-sea-duty categories for enlisted personnel: over 13 years, over 14 years, over 16 years, and over 18 years.

Department of Defense Authorization Act, 1986, Public Law 99-145, §634(a), 99 Stat. 583, 647 (1985)

- Increased rates for warrant officers in pay grades W-3 and W-4.
- Applied the four cumulative-years-of-sea-duty categories established for enlisted personnel in 1985 to all warrant and commissioned officers.

- Removed the prohibition of payment of CSP to officers in pay grades O-1 and O-2 with less than four years of either active enlisted or noncommissioned service.
    - The Navy would not provide this pay to these members until fiscal year 2002.

National Defense Authorization Act for Fiscal Years 1988 and 1989, Public Law 100-180, §621, 101 Stat. 1019, 1097-1100 (1987)-

- Increased CSP rates for enlisted personnel with more than five years of sea duty.
- Decreased CSP rates for enlisted personnel with less than five years of sea duty.
- Increased CSP rates for warrant officers in pay grades W-1, W-2, and W-3 with more than nine years of sea duty and warrant officers in pay grade W-4 with more than ten years of sea duty.
- Eliminated CSPP entitlements for enlisted personnel in pay grades above E-4 with more than five years of cumulative sea duty.

National Defense Authorization Act for Fiscal Year 2001, Public Law 106-398, 114 Stat. 1654A-156

- Authorized Service Secretaries to prescribe CSP and CSPP rates and codified authorization in Title 37 of the United States Code.
    - Set $750 a month as maximum possible CSP rate.
    - Set $350 a month as maximum possible CSPP rate.
- Restored CSPP entitlement that was eliminated in 1988 to those in grade E-4 with more than five years of cumulative sea duty.

Executive Order 13294, March 28, 2003

- Placed responsibility for carrying out the authority delegated to the President by 37 U.S.C. §301(a), relevant to career sea pay and other incentive pay, with the Secretaries of Commerce, Defense, Health and Human Services, and Homeland Defense as those entitlements affect military personnel under the respective jurisdiction of those departments.

APPENDIX B: DATA SUMMARY

A. ARGUS RESPONSES

Before 21 Aug 2003

Survey Question	1			2			3		
		Scale	Responses		Scale	Responses		Scale	Responses
	E7	1	71	E7	1	88	E7	1	61
	E7	2	107	E7	2	113	E7	2	101
	E7	3	149	E7	3	166	E7	3	173
	E7	4	226	E7	4	226	E7	4	393
	E7	5	78	E7	5	89	E7	5	137
	E7	6	37	E7	6	47	E7	6	80
	E7	7	12	E7	7	15	E7	7	30
	E8	1	18	E8	1	19	E8	1	12
	E8	2	28	E8	2	36	E8	2	40
	E8	3	49	E8	3	45	E8	3	38
	E8	4	64	E8	4	61	E8	4	99
	E8	5	24	E8	5	29	E8	5	49
	E8	6	5	E8	6	13	E8	6	26
	E8	7	7	E8	7	4	E8	7	8
	E9	1	6	E9	1	4	E9	1	5
	E9	2	8	E9	2	15	E9	2	10
	E9	3	23	E9	3	24	E9	3	16
	E9	4	26	E9	4	24	E9	4	51
	E9	5	10	E9	5	12	E9	5	19
	E9	6	4	E9	6	6	E9	6	14
	E9	7	6	E9	7	5	E9	7	9
	Total		958	Total		1041	Total		1371
	Wtd Avg		3.465	Wtd Avg		3.460	Wtd Avg		3.871

Survey Question	4			5			6		
		Scale	Responses		Scale	Responses		Scale	Responses
	E7	1	58	E7	1	58	E7	1	46
	E7	2	111	E7	2	106	E7	2	31
	E7	3	205	E7	3	185	E7	3	78
	E7	4	146	E7	4	32	E7	4	81
	E7	5	382	E7	5	317	E7	5	136
	E7	6	307	E7	6	241	E7	6	96
	E7	7	110	E7	7	74	E7	7	49
	E8	1	13	E8	1	14	E8	1	12
	E8	2	17	E8	2	26	E8	2	16
	E8	3	54	E8	3	46	E8	3	16
	E8	4	40	E8	4	8	E8	4	23
	E8	5	103	E8	5	87	E8	5	40
	E8	6	112	E8	6	99	E8	6	42
	E8	7	45	E8	7	31	E8	7	13
	E9	1	7	E9	1	8	E9	1	4
	E9	2	6	E9	2	11	E9	2	6
	E9	3	23	E9	3	19	E9	3	10
	E9	4	20	E9	4	2	E9	4	13
	E9	5	51	E9	5	53	E9	5	23
	E9	6	57	E9	6	41	E9	6	16
	E9	7	28	E9	7	21	E9	7	8
	Total		1895	Total		1479	Total		759
	Wtd Avg		4.661	Wtd Avg		4.555	Wtd Avg		4.423

After 21 Aug 2003

Survey Question	1			2			3		
		Scale	Responses		Scale	Responses		Scale	Responses
	E7	1	155	E7	1	184	E7	1	143
	E7	2	214	E7	2	248	E7	2	255
	E7	3	321	E7	3	354	E7	3	444
	E7	4	489	E7	4	514	E7	4	861
	E7	5	220	E7	5	262	E7	5	468
	E7	6	118	E7	6	147	E7	6	267
	E7	7	17	E7	7	37	E7	7	81
	E8	1	61	E8	1	64	E8	1	57
	E8	2	62	E8	2	76	E8	2	70
	E8	3	97	E8	3	112	E8	3	137
	E8	4	177	E8	4	168	E8	4	301
	E8	5	65	E8	5	83	E8	5	142
	E8	6	37	E8	6	55	E8	6	76
	E8	7	8	E8	7	12	E8	7	17
	E9	1	14	E9	1	19	E9	1	14
	E9	2	24	E9	2	27	E9	2	32
	E9	3	40	E9	3	47	E9	3	50
	E9	4	69	E9	4	65	E9	4	102
	E9	5	32	E9	5	39	E9	5	50
	E9	6	17	E9	6	17	E9	6	39
	E9	7	2	E9	7	10	E9	7	15
	Total		2239	Total		2540	Total		3621
	Wtd Avg		3.551	Wtd Avg		3.600	Wtd Avg		3.938

Survey Question	4			5			6		
		Scale	Responses		Scale	Responses		Scale	Responses
	E7	1	100	E7	1	126	E7	1	106
	E7	2	155	E7	2	205	E7	2	107
	E7	3	321	E7	3	446	E7	3	215
	E7	4	381	E7	4	457	E7	4	476
	E7	5	793	E7	5	932	E7	5	407
	E7	6	892	E7	6	926	E7	6	389
	E7	7	406	E7	7	381	E7	7	177
	E8	1	23	E8	1	27	E8	1	35
	E8	2	33	E8	2	52	E8	2	27
	E8	3	99	E8	3	118	E8	3	66
	E8	4	98	E8	4	113	E8	4	124
	E8	5	202	E8	5	251	E8	5	107
	E8	6	329	E8	6	350	E8	6	155
	E8	7	180	E8	7	173	E8	7	80
	E9	1	10	E9	1	13	E9	1	13
	E9	2	10	E9	2	10	E9	2	10
	E9	3	27	E9	3	32	E9	3	21
	E9	4	36	E9	4	52	E9	4	58
	E9	5	70	E9	5	82	E9	5	51
	E9	6	138	E9	6	156	E9	6	70
	E9	7	116	E9	7	114	E9	7	41
	Total		4419	Total		5016	Total		2735
	Wtd Avg		5.052	Wtd Avg		4.898	Wtd Avg		4.598

B. PRESCRIBED SEA TOUR EXTENSION DATA

Navy

	2000	2001	2002	2003	2004	2005	2006	Totals
Master Chief	51	82	122	124	53	10	4	446
Senior Chief	141	294	429	348	118	33	8	1371
Chief	488	798	1079	975	402	178	46	3966
First Class	886	1300	1310	1063	473	189	57	5278
Second Class	1278	2014	1939	924	474	186	70	6885
Third Class	154	404	599	338	86	44	14	1639
Seaman	6	17	29	38	6	6	2	104
Total	3004	4909	5507	3810	1612	646	201	19689

BM

	2000	2001	2002	2003	2004	2005	2006	Total
Master Chief	2	3	3	2	1			11
Senior Chief	2	7	9	9	4	3		34
Chief	17	20	38	34	23	10	3	145
First Class	21	43	41	47	34	11		197
Second Class	60	73	54	39	43	16	2	287
Third Class	3	7	1		5			16
Seaman		1						1
Total	105	154	146	131	110	40	5	691

CTI

	2000	2001	2002	2003	2004	2005	2006	Total
Master Chief	1		1	2				4
Senior Chief	1		1	1				3
Chief	6	1		2				9
First Class	3	6	6	1				16
Second Class			2	1				3
Third Class					1			1
Seaman								0
Total	11	7	10	7	1	0	0	36

FC

	2000	2001	2002	2003	2004	2005	2006	Total
Master Chief	3	1	4	8	2			18
Senior Chief	3	3	10	7	1			24
Chief	11	16	30	30	8	4	2	101
First Class	21	33	26	20	9	1	1	111
Second Class	26	50	49	16	12	11	2	166
Third Class	5	9	6	1		1		22
Seaman								0
Total	69	112	125	82	32	17	5	442

MA

	2000	2001	2002	2003	2004	2005	2006	Total
Master Chief	1		2					3
Senior Chief								0
Chief	2	3	6	2				13
First Class	9	11	31	7				58
Second Class	5	9	41	6				61
Third Class				1				1
Seaman								0
Total	17	23	80	16	0	0	0	136

OS

	2000	2001	2002	2003	2004	2005	2006	Total
Master Chief		1	6	4	2			13
Senior Chief	2	8	13	11	6			40
Chief	4	11	10	5	9	2		41
First Class	17	22	14	16	6	6		81
Second Class	48	67	28	18	10	13	5	189
Third Class	4	1	1					6
Seaman								0
Total	75	110	72	54	33	21	5	370

C. END STRENGTH DATA

Duty Types 1, 3, & 6

		2001				2002				2003			
Rating	Pay Grade Group	JAN	APR	JUL	OCT	JAN	APR	JUL	OCT	JAN	APR	JUL	OCT
BM	E1-E3	33	38	37	39	38	40	36	29	27	42	43	48
	E4-E6	2329	2345	2325	2224	2264	2232	2243	2123	2131	2113	2145	2062
	E7-E9	597	560	574	590	588	573	551	535	535	528	522	547
CTI	E1-E3	45	61	42	53	49	48	39	50	37	88	98	123
	E4-E6	801	799	810	836	838	879	902	886	886	899	939	957
	E7-E9	143	138	135	140	137	136	135	134	130	127	128	134
FC	E1-E3	525	911	1166	1083	950	998	865	710	516	471	382	303
	E4-E6	1942	2126	2154	2203	2396	2494	2448	2322	2449	2581	2493	2527
	E7-E9	658	613	627	678	675	642	645	648	646	645	623	606
MA	E1-E3	2	2	5	44	194	339	507	1282	1873	2206	2255	2560
	E4-E6	800	868	1002	1071	1156	1289	1476	1719	1983	2369	2970	3390
	E7-E9	285	274	278	302	307	309	315	346	354	348	350	414
OS	E1-E3	611	414	362	463	443	453	284	319	321	357	362	336
	E4-E6	2098	2146	2213	2170	2274	2320	2404	2341	2425	2469	2514	2433
	E7-E9	436	421	410	452	446	447	449	449	463	466	453	473
SUBTOTAL		11305	11716	12140	12348	12755	13199	13299	13893	14776	15709	16277	16913
ALL NAVY		155764	153675	157146	162766	160781	159196	160919	159989	158922	157082	158520	160026

		2004				2005				2006			
Rating	Pay Grade Group	JAN	APR	JUL	OCT	JAN	APR	JUL	OCT	JAN	APR	JUL	OCT
BM	E1-E3	44	45	48	42	36	44	52	46	54	54	48	74
	E4-E6	2003	2003	2019	1953	1900	1845	1759	1697	1605	1556	1513	1356
	E7-E9	540	540	541	558	556	544	521	553	537	535	441	450
CTI	E1-E3	86	81	33	34	54	111	62	78	55	26	138	73
	E4-E6	974	974	1010	978	974	993	995	1009	1041	1067	1047	1014
	E7-E9	132	132	124	129	135	134	136	144	140	138	131	150
FC	E1-E3	281	281	263	219	242	333	312	392	398	525	594	586
	E4-E6	2502	2502	2504	2454	2376	2349	2308	2233	2202	2170	2139	1908
	E7-E9	560	560	556	530	547	539	514	532	520	504	497	522
MA	E1-E3	2525	2525	2200	1611	1456	1573	1555	1323	1398	1644	1601	1684
	E4-E6	4359	4359	4964	5606	5831	5905	6097	6362	6380	6237	6240	5889
	E7-E9	430	430	442	545	564	572	594	633	629	631	609	641
OS	E1-E3	477	477	357	537	699	538	405	341	314	319	251	333
	E4-E6	2399	2399	2501	2440	2376	2291	2203	2158	2136	2134	2125	2007
	E7-E9	475	475	481	484	487	482	477	480	466	459	437	445
SUBTOTAL		17787	17783	18043	18120	18233	18253	17990	17981	17875	17999	17811	17132
ALL NAVY		152218	152218	154629	154388	150577	146790	148034	149489	145313	144461	142426	140930

Duty Types 2 & 4

		2001				2002				2003			
Rating	Pay Grade Group	JAN	APR	JUL	OCT	JAN	APR	JUL	OCT	JAN	APR	JUL	OCT
BM	E1-E3	115	131	130	108	89	89	76	92	87	127	132	148
	E4-E6	2993	2835	2777	2631	2581	2532	2809	2638	2835	2734	2969	2793
	E7-E9	573	575	553	602	597	598	606	637	629	623	614	617
CTI	E1-E3	5	11	10	8	5	9	6	5	5	5	3	3
	E4-E6	309	300	315	322	344	346	367	372	397	417	436	433
	E7-E9	36	38	38	45	46	49	48	53	53	57	57	61
FC	E1-E3	172	205	191	232	184	178	156	179	156	136	116	118
	E4-E6	4514	4538	4646	4680	4787	4851	4976	5013	5027	4923	4932	4640
	E7-E9	451	405	387	445	447	462	453	454	448	441	441	489
MA	E1-E3	1	1	1	2	12	22	33	108	135	137	160	189
	E4-E6	429	414	407	416	444	483	548	580	622	666	717	697
	E7-E9	130	126	115	130	133	135	131	141	134	141	151	157
OS	E1-E3	1486	1774	1447	1355	1370	1479	1239	1217	1025	1072	1150	1266
	E4-E6	3672	3479	3784	3727	3748	3615	3864	3644	3865	3745	4120	3780
	E7-E9	363	359	365	392	393	388	379	410	389	389	392	419
SUBTOTAL		15249	15191	15166	15095	15180	15236	15691	15543	15807	15613	16390	15810
ALL NAVY		155759	158367	158411	157940	161272	163901	164974	165362	166208	165558	165166	161805

		2004				2005				2006			
Rating	Pay Grade Group	JAN	APR	JUL	OCT	JAN	APR	JUL	OCT	JAN	APR	JUL	OCT
BM	E1-E3	176	176	161	162	175	195	350	296	330	309	260	153
	E4-E6	2963	2963	3053	2910	2861	2745	2647	2678	2702	2597	2547	2452
	E7-E9	588	588	583	606	590	582	585	608	585	564	489	407
CTI	E1-E3	6	6	2	5	2	2	5	4	2	2	2	3
	E4-E6	486	486	497	501	509	502	489	445	417	402	383	374
	E7-E9	62	62	66	70	63	64	59	59	56	57	51	63
FC	E1-E3	141	141	142	132	140	132	124	141	147	128	145	202
	E4-E6	4408	4408	4202	3894	3821	3716	3540	3314	3229	3186	3028	2874
	E7-E9	503	503	494	542	513	507	502	537	535	520	496	576
MA	E1-E3	119	119	133	135	153	168	162	121	142	172	209	225
	E4-E6	769	769	874	890	951	958	1010	1050	1101	1161	1216	1234
	E7-E9	160	160	165	183	186	187	183	190	190	173	172	184
OS	E1-E3	1366	1366	1022	1077	1275	1509	1525	1116	1071	1143	971	819
	E4-E6	3855	3855	4195	3886	3728	3606	3526	3701	3689	3538	3629	3560
	E7-E9	416	416	407	427	418	413	390	435	433	418	402	430
SUBTOTAL		16018	16018	15996	15420	15385	15286	15097	14695	14629	14370	14000	13556
ALL NAVY		166215	166215	163234	160339	161102	160584	157778	154549	155830	154092	152020	150629

Percentage at Sea
(Duty Types 2 & 4/Total)

		2001				2002				2003			
Rating	Pay Grade Group	JAN	APR	JUL	OCT	JAN	APR	JUL	OCT	JAN	APR	JUL	OCT
BM	E1-E3	77.70%	77.51%	77.84%	73.47%	70.08%	68.99%	67.86%	76.03%	76.32%	75.15%	75.43%	75.51%
	E4-E6	56.24%	54.73%	54.43%	54.19%	53.27%	53.15%	55.60%	55.41%	57.09%	56.41%	58.06%	57.53%
	E7-E9	48.97%	50.66%	49.07%	50.50%	50.38%	51.07%	52.38%	54.35%	54.04%	54.13%	54.05%	53.01%
CTI	E1-E3	10.00%	15.28%	19.23%	13.11%	9.26%	15.79%	13.33%	9.09%	11.90%	5.38%	2.97%	2.38%
	E4-E6	27.84%	27.30%	28.00%	27.81%	29.10%	28.24%	28.92%	29.57%	30.94%	31.69%	31.71%	31.15%
	E7-E9	20.11%	21.59%	21.97%	24.32%	25.14%	26.49%	26.23%	28.34%	28.96%	30.98%	30.81%	31.28%
FC	E1-E3	24.68%	18.37%	14.08%	17.64%	16.23%	15.14%	15.28%	20.13%	23.21%	22.41%	23.29%	28.03%
	E4-E6	69.92%	68.10%	68.32%	67.99%	66.64%	66.04%	67.03%	68.34%	67.24%	65.61%	66.42%	64.74%
	E7-E9	40.67%	39.78%	38.17%	39.63%	39.84%	41.85%	41.26%	41.20%	40.95%	40.61%	41.45%	44.66%
MA	E1-E3	33.33%	33.33%	16.67%	4.35%	5.83%	6.09%	6.11%	7.77%	6.72%	5.85%	6.63%	6.88%
	E4-E6	34.91%	32.29%	28.89%	27.98%	27.75%	27.26%	27.08%	25.23%	23.88%	21.94%	19.45%	17.05%
	E7-E9	31.33%	31.50%	29.26%	30.09%	30.23%	30.41%	29.37%	28.95%	27.46%	28.83%	30.14%	27.50%
OS	E1-E3	70.86%	81.08%	79.99%	74.53%	75.57%	76.55%	81.35%	79.23%	76.15%	75.02%	76.06%	79.03%
	E4-E6	63.64%	61.85%	63.10%	63.20%	62.24%	60.91%	61.65%	60.89%	61.45%	60.27%	62.10%	60.84%
	E7-E9	45.43%	46.03%	47.10%	46.45%	46.84%	46.47%	45.77%	47.73%	45.66%	45.50%	46.39%	46.97%
SUBTOTAL		57.43%	56.46%	55.54%	55.00%	54.34%	53.58%	54.13%	52.80%	51.69%	49.85%	50.17%	48.31%
ALL NAVY		50.00%	50.75%	50.20%	49.25%	50.08%	50.73%	50.62%	50.83%	51.12%	51.31%	51.03%	50.28%

		2004				2005				2006			
Rating	Pay Grade Group	JAN	APR	JUL	OCT	JAN	APR	JUL	OCT	JAN	APR	JUL	OCT
BM	E1-E3	80.00%	79.64%	77.03%	79.41%	82.94%	81.59%	87.06%	86.55%	85.94%	85.12%	84.42%	67.40%
	E4-E6	59.67%	59.67%	60.19%	59.84%	60.09%	59.80%	60.08%	61.21%	62.74%	62.53%	62.73%	64.39%
	E7-E9	52.13%	52.13%	51.87%	52.06%	51.48%	51.69%	52.89%	52.37%	52.14%	51.32%	52.58%	47.49%
CTI	E1-E3	6.52%	6.90%	5.71%	12.82%	3.57%	1.77%	7.46%	4.88%	3.51%	7.14%	1.43%	3.95%
	E4-E6	33.29%	33.29%	32.98%	33.87%	34.32%	33.58%	32.95%	30.61%	28.60%	27.37%	26.78%	26.95%
	E7-E9	31.96%	31.96%	34.74%	35.18%	31.82%	32.32%	30.26%	29.06%	28.57%	29.23%	28.02%	29.58%
FC	E1-E3	33.41%	33.41%	35.06%	37.61%	36.65%	28.39%	28.44%	26.45%	26.97%	19.60%	19.62%	25.63%
	E4-E6	63.79%	63.79%	62.66%	61.34%	61.66%	61.27%	60.53%	59.74%	59.45%	59.48%	58.60%	60.10%
	E7-E9	47.32%	47.32%	47.05%	50.56%	48.40%	48.47%	49.41%	50.23%	50.71%	50.78%	49.95%	52.46%
MA	E1-E3	4.50%	4.50%	5.70%	7.73%	9.51%	9.65%	9.44%	8.38%	9.22%	9.47%	11.55%	11.79%
	E4-E6	15.00%	15.00%	14.97%	13.70%	14.02%	13.96%	14.21%	14.17%	14.72%	15.69%	16.31%	17.32%
	E7-E9	27.12%	27.12%	27.18%	25.14%	24.80%	24.64%	23.55%	23.09%	23.20%	21.52%	22.02%	22.30%
OS	E1-E3	74.12%	74.12%	74.11%	66.73%	64.59%	73.72%	79.02%	76.60%	77.33%	78.18%	79.46%	71.09%
	E4-E6	61.64%	61.64%	62.65%	61.43%	61.07%	61.15%	61.55%	63.17%	63.33%	62.38%	63.07%	63.95%
	E7-E9	46.69%	46.69%	45.83%	46.87%	46.19%	46.15%	44.98%	47.54%	48.16%	47.66%	47.91%	49.14%
SUBTOTAL		47.38%	47.39%	46.99%	45.97%	45.76%	45.58%	45.63%	44.97%	45.01%	44.39%	44.01%	44.17%
ALL NAVY		52.20%	52.20%	51.35%	50.95%	51.69%	52.24%	51.59%	50.83%	51.75%	51.61%	51.63%	51.66%

D. PERSONNEL TRACKING DATA

ALL BM

		Consecutive Sea Duty			EAOS Change at Sea						Consecutive Sea Duty		EAOS Change at Sea			
	Total	Number	Months Generated	CSPP Eligible	Number Extending	Months Generated	CSPP Eligible	Number Reenlisting	Months Generated	CSPP Eligible	Percentage	CSPP Eligible	Extend Percentage	CSPP Eligible	Reenlist Percentage	CSPP Eligible
Oct-00	6658	235	5706	104	584	7445	255	184	3537	107	3.53%	44.26%	8.77%	43.66%	2.76%	58.15%
Apr-01	6513	201	4788	71	653	8175	303	207	4859	115	3.09%	35.32%	10.03%	46.40%	3.18%	55.56%
Oct-01	6207	157	3825	71	1036	12104	361	199	4954	102	2.53%	45.22%	16.69%	34.85%	3.21%	51.26%
Apr-02	6081	173	4218	60	526	6746	228	175	3924	106	2.84%	34.68%	8.65%	43.35%	2.88%	60.57%
Oct-02	6067	203	5007	87	572	6924	239	144	3099	83	3.35%	42.86%	9.43%	41.78%	2.37%	57.64%
Apr-03	6177	243	6129	92	668	8694	289	188	4514	96	3.93%	37.86%	10.81%	43.26%	3.04%	51.06%
Oct-03	6222	211	5310	85	668	5699	240	155	3309	77	3.39%	40.28%	10.74%	35.93%	2.49%	49.68%
Apr-04	6321	238	6003	72	692	9744	272	189	4063	100	3.77%	30.25%	10.95%	39.31%	2.99%	52.91%
Oct-04	6213	276	6975	115	606	8084	223	179	3774	90	4.44%	41.67%	9.75%	36.80%	2.88%	50.28%
Apr-05	5955	240	6171	108	504	6656	157	360	8204	202	4.03%	45.00%	8.46%	31.15%	6.05%	56.11%
Oct-05	5878	273	6957	111	493	6528	156	323	8279	157	4.64%	40.66%	8.39%	31.64%	5.50%	48.61%
Apr-06	5615	219	5394	99	457	5756	139	213	5171	106	3.90%	45.21%	8.14%	30.42%	3.79%	49.77%

ALL CTI

		Consecutive Sea Duty			EAOS Change at Sea						Consecutive Sea Duty		EAOS Change at Sea			
	Total	Number	Months Generated	CSPP Eligible	Number Extending	Months Generated	CSPP Eligible	Number Reenlisting	Months Generated	CSPP Eligible	Percentage	CSPP Eligible	Extend Percentage	CSPP Eligible	Reenlist Percentage	CSPP Eligible
Oct-00	1333	3	108	1	39	426	9	36	1404	12	0.23%	33.33%	2.93%	23.08%	2.70%	33.33%
Apr-01	1340	13	396	4	35	364	3	23	716	8	0.97%	30.77%	2.61%	8.57%	1.72%	34.78%
Oct-01	1404	8	198	4	144	2372	22	34	1040	12	0.57%	50.00%	10.26%	15.28%	2.42%	35.29%
Apr-02	1467	6	198	4	36	430	16	18	759	6	0.41%	66.67%	2.45%	44.44%	1.23%	33.33%
Oct-02	1500	69	2412	4	20	262	12	24	970	8	4.60%	5.80%	1.33%	60.00%	1.60%	33.33%
Apr-03	1593	10	342	4	42	467	15	26	1023	11	0.63%	40.00%	2.64%	35.71%	1.63%	42.31%
Oct-03	1711	18	630	7	145	164	14	18	735	5	1.05%	38.89%	8.47%	9.66%	1.05%	27.78%
Apr-04	1741	17	558	9	172	3235	11	25	1131	9	0.98%	52.94%	9.88%	6.40%	1.44%	36.00%
Oct-04	1717	44	1494	15	197	3491	10	20	856	9	2.56%	34.09%	11.47%	5.08%	1.16%	45.00%
Apr-05	1806	15	540	5	171	2870	13	27	1157	6	0.83%	33.33%	9.47%	7.60%	1.50%	22.22%
Oct-05	1739	17	558	6	128	2084	13	28	1299	7	0.98%	35.29%	7.36%	10.16%	1.61%	25.00%
Apr-06	1693	24	756	5	98	1355	13	30	1219	9	1.42%	20.83%	5.79%	13.27%	1.77%	30.00%

ALL FC

		Consecutive Sea Duty			EAOS Change at Sea						Consecutive Sea Duty		EAOS Change at Sea			
	Total	Number	Months Generated	CSPP Eligible	Number Extending	Months Generated	CSPP Eligible	Number Reenlisting	Months Generated	CSPP Eligible	Percentage	CSPP Eligible	Extend Percentage	CSPP Eligible	Reenlist Percentage	CSPP Eligible
Oct-00	8219	234	6145.5	47	370	4433	72	363	10839	87	2.85%	20.09%	4.50%	19.46%	4.42%	23.97%
Apr-01	8830	143	3750	34	436	5738	80	507	16024	108	1.62%	23.78%	4.94%	18.35%	5.74%	21.30%
Oct-01	9351	140	3652.5	28	2276	45595	141	470	13506	126	1.50%	20.00%	24.34%	6.20%	5.03%	26.81%
Apr-02	9660	140	3336.75	44	297	3874	131	288	6871.5	79	1.45%	31.43%	3.07%	44.11%	2.98%	27.43%
Oct-02	9360	276	6573.75	85	352	4822	142	308	7744	77	2.95%	30.80%	3.76%	40.34%	3.29%	25.00%
Apr-03	9227	272	6678	73	304	2955	130	101	1954.5	42	2.95%	26.84%	3.29%	42.76%	1.09%	41.58%
Oct-03	8703	162	3943.5	61	1965	2045	45	73	1613.5	26	1.86%	37.65%	22.58%	2.29%	0.84%	35.62%
Apr-04	8412	277	6810	74	1443	30798	55	115	3149.5	30	3.29%	26.71%	17.15%	3.81%	1.37%	26.09%
Oct-04	7782	179	4400.25	57	1226	25696	76	103	2639	27	2.30%	31.84%	15.75%	6.20%	1.32%	26.21%
Apr-05	7566	261	6427.5	84	888	17796	63	325	7821	107	3.45%	32.18%	11.74%	7.09%	4.30%	32.92%
Oct-05	7149	119	2833.5	49	859	17050	69	273	5969	105	1.66%	41.18%	12.02%	8.03%	3.82%	38.46%
Apr-06	7033	153	3708	62	808	16090	74	300	7658	127	2.18%	40.52%	11.49%	9.16%	4.27%	42.33%

ALL MA

		Consecutive Sea Duty			EAOS Change at Sea						Consecutive Sea Duty		EAOS Change at Sea			
	Total	Number	Months Generated	CSPP Eligible	Number Extending	Months Generated	CSPP Eligible	Number Reenlisting	Months Generated	CSPP Eligible	Percentage	CSPP Eligible	Extend Percentage	CSPP Eligible	Reenlist Percentage	CSPP Eligible
Oct-00	1642	29	648	8	68	772	16	49	1290	19	1.77%	27.59%	4.14%	23.53%	2.98%	38.78%
Apr-01	1688	11	228	2	49	600	12	38	1225	6	0.65%	18.18%	2.90%	24.49%	2.25%	15.79%
Oct-01	1965	19	429	5	119	1249	15	40	985	13	0.97%	26.32%	6.06%	12.61%	2.04%	32.50%
Apr-02	2579	30	600	2	74	807	16	34	733	9	1.16%	6.67%	2.87%	21.62%	1.32%	26.47%
Oct-02	4178	17	327	1	68	794	15	40	808	11	0.41%	5.88%	1.63%	22.06%	0.96%	27.50%
Apr-03	5869	18	369	2	65	738	14	46	886	15	0.31%	11.11%	1.11%	21.54%	0.78%	32.61%
Oct-03	7411	27	630	2	197	607	12	78	2010	17	0.36%	7.41%	2.66%	6.09%	1.05%	21.79%
Apr-04	8364	13	258	4	207	2541	14	60	1427	14	0.16%	30.77%	2.47%	6.76%	0.72%	23.33%
Oct-04	8971	33	735	8	299	3578	32	55	1254	20	0.37%	24.24%	3.33%	10.70%	0.61%	36.36%
Apr-05	9363	29	633	4	353	4456	43	82	1864	25	0.31%	13.79%	3.77%	12.18%	0.88%	30.49%
Oct-05	9679	33	741	5	346	4292	28	83	1548	38	0.34%	15.15%	3.57%	8.09%	0.86%	45.78%
Apr-06	10019	24	528	8	321	3957	21	65	1817	12	0.24%	33.33%	3.20%	6.54%	0.65%	18.46%

ALL OS

		Consecutive Sea Duty			EAOS Change at Sea							Consecutive Sea Duty		EAOS Change at Sea			
	Total	Number	Months Generated	CSPP Eligible	Number Extending	Months Generated	CSPP Eligible	Number Reenlisting	Months Generated	CSPP Eligible		Percentage	CSPP Eligible	Extend Percentage	CSPP Eligible	Reenlist Percentage	CSPP Eligible
Oct-00	8522	268	7203	85	315	2981	125	317	7907	183		3.14%	31.72%	3.70%	39.68%	3.72%	57.73%
Apr-01	8683	216	5940	52	313	2845	134	285	8132	155		2.49%	24.07%	3.60%	42.81%	3.28%	54.39%
Oct-01	8596	219	5880	79	1122	11847	276	325	8488	184		2.55%	36.07%	13.05%	24.60%	3.78%	56.62%
Apr-02	8751	268	7320	91	435	4106	196	283	7353	162		3.06%	33.96%	4.97%	45.06%	3.23%	57.24%
Oct-02	8421	226	6072	74	376	3914	165	299	7743	179		2.68%	32.74%	4.47%	43.88%	3.55%	59.87%
Apr-03	8534	319	8727	115	445	4358	205	326	8411	196		3.74%	36.05%	5.21%	46.07%	3.82%	60.12%
Oct-03	8735	242	6531	102	859	2222	203	229	5792	133		2.77%	42.15%	9.83%	23.63%	2.62%	58.08%
Apr-04	9010	259	7131	92	924	10561	194	386	10359	219		2.87%	35.52%	10.26%	21.00%	4.28%	56.74%
Oct-04	8863	295	8094	97	896	10224	148	306	8240	151		3.33%	32.88%	10.11%	16.52%	3.45%	49.35%
Apr-05	8839	293	8010	88	1101	12354	144	382	10527	193		3.31%	30.03%	12.46%	13.08%	4.32%	50.52%
Oct-05	8232	220	5913	61	1205	13535	94	311	8927	131		2.67%	27.73%	14.64%	7.80%	3.78%	42.12%
Apr-06	8013	208	5613	61	1243	14207	152	199	5720	86		2.60%	29.33%	15.51%	12.23%	2.48%	43.22%

E. COST DATA

1. Career Sea Pay and Career Sea Pay Premium Costs

All Navy

Fiscal Year	CSP*	CSPP*
2000	220,608	14,180
2001	213,145	15,109
2002	307,359	18,870
2003	306,749	20,125
2004	287,056	20,970
2005	268,347	20,953
2006	253,169	20,621

*2006 Dollars

Five Ratings of Interest

		Career Sea Pay Cost ($2006)				
Fiscal Year	Rating	BM	FC	OS	CTI	MA
2002*	[redacted]	9,195,113	17,527,108	15,219,931	40,393	1,124,708
2003*	[redacted]	9,727,417	17,824,535	14,121,200	47,010	1,664,998
2004*	[redacted]	9,549,166	15,124,305	13,824,724	51,325	1,819,343
2005	[redacted]	8,685,057	12,299,531	13,185,807	50,213	2,038,075
2006	[redacted]	6,932,088	11,069,195	11,595,545	44,068	1,782,274

* Estimate

		Career Sea Pay Premium Cost ($2006)				
Fiscal Year	Rating	BM	FC	OS	CTI	MA
2002*	[redacted]	601,239	1,620,423	1,338,839	0	25,921
2003*	[redacted]	679,687	1,760,996	1,327,423	0	41,006
2004*	[redacted]	742,945	1,663,778	1,447,018	0	49,892
2005	[redacted]	722,233	1,446,178	1,475,154	0	59,738
2006	[redacted]	467,326	1,367,748	1,138,393	0	46,823

* Estimate

2. Selective Reenlistment Bonus Cost Data

Year	Number of SRB's	Dollar Amount ($CY)
2006	3,055	$26,455,241
2005	2,716	$23,923,226
2004	2,316	$18,048,922
2003	2,357	$17,886,654
2002	2,062	$23,987,394
2001	2,566	$31,592,682
2000	1,661	$16,792,087

Year	Rate	Number of SRB's	Dollar Amount ($CY)
2000	BM	0	$0
	CTI	115	$1,430,610
	FC	577	$9,820,407
	MA	321	$726,336
	OS	648	$4,814,735
2001	BM	0	$0
	CTI	178	$2,780,346
	FC	1259	$21,795,224
	MA	417	$1,029,962
	OS	712	$5,987,149
2002	BM	0	$0
	CTI	164	$2,565,360
	FC	858	$14,986,448
	MA	441	$1,470,180
	OS	599	$4,965,406
2003	BM	0	$0
	CTI	123	$1,867,389
	FC	732	$9,087,379
	MA	767	$3,430,025
	OS	735	$3,501,862
2004	BM	0	$0
	CTI	73	$1,080,175
	FC	357	$4,568,833
	MA	1078	$8,166,795
	OS	808	$4,233,118
2005	BM	278	$1,390,381
	CTI	78	$1,385,912
	FC	641	$9,086,825
	MA	907	$7,610,313
	OS	812	$4,449,794
2006	BM	573	$2,442,065
	CTI	128	$2,129,237
	FC	839	$11,433,356
	MA	892	$7,280,509
	OS	623	$3,170,074

3. Advancement Data

CYCLE 174 (JAN 2002)

	Type Duty 1		Type Duty 2		Type Duty 3		Type Duty 4		Type Duty 6		Advancement Rate			
Exam	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	Type Duty 1	Type Duty 2	Type Duties 1, 3, & 6	Type Duties 2 & 4
BMC	354	70	317	77	19	1	55	11	29	6	19.774%	24.290%	19.154%	23.656%
CTIC	137	12	50	9	2	1	11	0	28	4	8.759%	18.000%	10.180%	14.754%
FCC	358	74	271	61	4	0	35	11	15	1	20.670%	22.509%	19.894%	23.529%
MAC	161	28	103	32	34	9	18	7	53	14	17.391%	31.068%	20.565%	32.231%
OSC	285	60	306	91	7	2	41	12	26	4	21.053%	29.739%	20.755%	29.683%

CYCLE 175 (MAR 2002)

	Type Duty 1		Type Duty 2		Type Duty 3		Type Duty 4		Type Duty 6		Advancement Rate			
Exam	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	Type Duty 1	Type Duty 2	Type Duties 1, 3, & 6	Type Duties 2 & 4
BM1	588	65	559	72	45	3	86	8	43	5	11.054%	12.880%	10.799%	12.403%
BM2	262	136	469	221	24	12	88	40	23	12	51.908%	47.122%	51.780%	46.858%
BM3	44	44	368	364	3	3	81	80	1	1	100.000%	98.913%	100.000%	98.886%
CTI1	74	23	37	11	4	0	4	2	18	6	31.081%	29.730%	30.208%	31.707%
CTI2	181	23	65	5	6	2	18	2	43	5	12.707%	7.692%	13.043%	8.434%
CTI3	9	8	4	4							88.889%	100.000%	88.889%	100.000%
FC1	261	89	215	75	2	0	26	10	8	4	34.100%	34.884%	34.317%	35.270%
FC2	452	17	1715	129	5	0	247	21	5	0	3.761%	7.522%	3.680%	7.645%
FC3	6	6	40	39			4	4			100.000%	97.500%	100.000%	97.727%
MA1	134	59	62	29	42	15	13	5	68	32	44.030%	46.774%	43.443%	45.333%
MA2	77	71	34	30	38	38	7	7	32	31	92.208%	88.235%	95.238%	90.244%
MA3	38	38	30	30	17	17			52	52	100.000%	100.000%	100.000%	100.000%
OS1	645	110	476	114	18	2	75	16	58	6	17.054%	23.950%	16.366%	23.593%
OS2	95	86	496	469	5	3	93	80	16	13	90.526%	94.556%	87.931%	93.209%
OS3	89	87	415	410	2	2	74	73	6	6	97.753%	98.795%	97.938%	98.773%

CYCLE 176
(SEP 2002)

	Type Duty 1		Type Duty 2		Type Duty 3		Type Duty 4		Type Duty 6		Advancement Rate			
Exam	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	Type Duty 1	Type Duty 2	Type Duties 1, 3, & 6	Type Duties 2 & 4
BM1	515	84	503	88	50	10	91	15	41	7	16.311%	17.495%	16.667%	17.340%
BM2	204	91	526	197	22	12	101	34	22	8	44.608%	37.452%	44.758%	36.842%
BM3	72	72	480	478	1	1	95	95	3	3	100.000%	99.583%	100.000%	99.652%
CTI1	93	37	31	11	4	3	4	1	19	8	39.785%	35.484%	41.379%	34.286%
CTI2	214	46	86	21	5	0	22	5	43	10	21.495%	24.419%	21.374%	24.074%
CTI3	5	5	1	1					3	3	100.000%	100.000%	100.000%	100.000%
FC1	266	81	236	95	4	1	32	10	11	0	30.451%	40.254%	29.181%	39.179%
FC2	386	19	2056	214	5	0	304	36	6	1	4.922%	10.409%	5.038%	10.593%
FC3	2	2	38	28			2	1			100.000%	73.684%	100.000%	72.500%
MA1	232	133	82	53	47	29	13	8	93	60	57.328%	64.634%	59.677%	64.211%
MA2	91	90	28	28	27	27	3	3	50	50	98.901%	100.000%	99.405%	100.000%
MA3	196	196	33	33	64	64	3	3	81	81	100.000%	100.000%	100.000%	100.000%
OS1	709	95	444	101	18	1	57	6	64	12	13.399%	22.748%	13.654%	21.357%
OS2	92	88	494	486	7	7	106	101	10	10	95.652%	98.381%	96.330%	97.833%
OS3	116	112	679	661	2	2	124	121	15	13	96.552%	97.349%	95.489%	97.385%

CYCLE 178
(JAN 2003)

	Type Duty 1		Type Duty 2		Type Duty 3		Type Duty 4		Type Duty 6		Advancement Rate			
Exam	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	Type Duty 1	Type Duty 2	Type Duties 1, 3, & 6	Type Duties 2 & 4
BMC	261	58	281	88	15	4	58	20	27	4	22.222%	31.317%	21.782%	31.858%
CTIC	136	14	54	7	3	0	6	1	34	3	10.294%	12.963%	9.827%	13.333%
FCC	421	77	322	63	6	1	43	9	15	2	18.290%	19.565%	18.100%	19.726%
MAC	236	58	125	32	33	9	22	7	90	21	24.576%	25.600%	24.513%	26.531%
OSC	313	55	346	81	6	0	48	16	35	6	17.572%	23.410%	17.232%	24.619%

CYCLE 179
(MAR 2003)

	Type Duty 1		Type Duty 2		Type Duty 3		Type Duty 4		Type Duty 6		Advancement Rate			
Exam	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	Type Duty 1	Type Duty 2	Type Duties 1, 3, & 6	Type Duties 2 & 4
BM1	410	50	414	83	39	7	83	16	32	6	12.195%	20.048%	13.098%	19.920%
BM2	176	53	541	195	14	6	117	44	17	5	30.114%	36.044%	30.918%	36.322%
BM3	66	64	461	452			87	85	4	4	96.970%	98.048%	97.143%	97.993%
CTI1	85	23	26	12	2	0	4	1	16	5	27.059%	46.154%	27.184%	43.333%
CTI2	235	45	92	17	5	1	19	11	46	13	19.149%	18.478%	20.629%	25.225%
CTI3	7	7									100.000%		100.000%	
FC1	390	52	225	34	7	1	31	8	15	2	13.333%	15.111%	13.350%	16.406%
FC2	466	9	2142	120	11	1	315	17	9	1	1.931%	5.602%	2.263%	5.576%
FC3	3	0	27	4			7	1			0.000%	14.815%	0.000%	14.706%
MA1	234	125	73	40	58	26	16	10	95	42	53.419%	54.795%	49.871%	56.180%
MA2	114	69	52	38	35	29	1	1	79	46	60.526%	73.077%	63.158%	73.585%
MA3	324	324	49	49	62	62	2	2	123	123	100.000%	100.000%	100.000%	100.000%
OS1	695	27	428	41	25	2	69	7	56	6	3.885%	9.579%	4.510%	9.658%
OS2	91	41	400	248	8	5	69	40	8	3	45.055%	62.000%	45.794%	61.407%
OS3	101	21	537	197	2	1	146	47	9	1	20.792%	36.685%	20.536%	35.725%

CYCLE 180
(SEP 2003)

	Type Duty 1		Type Duty 2		Type Duty 3		Type Duty 4		Type Duty 6		Advancement Rate			
Exam	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	Type Duty 1	Type Duty 2	Type Duties 1, 3, & 6	Type Duties 2 & 4
BM1	417	101	378	105	26	4	72	22	37	10	24.221%	27.778%	23.958%	28.222%
BM2	213	64	606	239	14	9	112	41	20	8	30.047%	39.439%	32.794%	38.997%
BM3	107	33	833	369	2	0	170	71	5	0	30.841%	44.298%	28.947%	43.868%
CTI1	81	26	28	12	3	1	4	1	19	9	32.099%	42.857%	34.951%	40.625%
CTI2	245	48	101	32	3	0	11	5	44	18	19.592%	31.683%	22.603%	33.036%
CTI3	4	4	1	1							100.000%	100.000%	100.000%	100.000%
FC1	541	130	274	86	13	6	51	19	20	4	24.030%	31.387%	24.390%	32.308%
FC2	370	16	2242	123	5	0	322	13	8	0	4.324%	5.486%	4.178%	5.304%
FC3	2	0	38	4			5	1			0.000%	10.526%	0.000%	11.628%
MA1	300	48	80	9	59	6	15	5	127	16	16.000%	11.250%	14.403%	14.737%
MA2	347	178	66	35	82	50	9	3	144	64	51.297%	53.030%	50.960%	50.667%
MA3	416	316	43	33	62	51	3	2	204	146	75.962%	76.744%	75.220%	76.087%
OS1	715	138	464	123	22	5	74	25	70	12	19.301%	26.509%	19.207%	27.509%
OS2	120	60	776	546	7	2	105	73	17	10	50.000%	70.361%	50.000%	70.261%
OS3	149	113	822	704	2	1	156	126	12	7	75.839%	85.645%	74.233%	84.867%

CYCLE 182
(JAN 2004)

	Type Duty 1		Type Duty 2		Type Duty 3		Type Duty 4		Type Duty 6		Advancement Rate			
Exam	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	Type Duty 1	Type Duty 2	Type Duties 1, 3, & 6	Type Duties 2 & 4
BMC	247	38	280	91	18	2	37	8	23	1	15.385%	32.500%	14.236%	31.230%
CTIC	136	25	47	10			3	0	24	4	18.382%	21.277%	18.125%	20.000%
FCC	445	64	342	52	8	1	50	12	14	1	14.382%	15.205%	14.133%	16.327%
MAC	438	131	160	52	62	12	29	6	127	31	29.909%	32.500%	27.751%	30.688%
OSC	364	42	375	53	8	0	46	7	24	0	11.538%	14.133%	10.606%	14.252%

CYCLE 183
(MAR 2004)

	Type Duty 1		Type Duty 2		Type Duty 3		Type Duty 4		Type Duty 6		Advancement Rate			
Exam	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	Type Duty 1	Type Duty 2	Type Duties 1, 3, & 6	Type Duties 2 & 4
BM1	361	7	316	20	21	0	49	2	25	0	1.939%	6.329%	1.720%	6.027%
BM2	201	19	704	70	22	1	116	8	9	1	9.453%	9.943%	9.052%	9.512%
BM3	136	22	841	177	7	1	141	34	2	0	16.176%	21.046%	15.862%	21.487%
CTI1	72	29	27	10	6	1	5	2	14	6	40.278%	37.037%	39.130%	37.500%
CTI2	278	35	95	11	1	0	11	2	36	6	12.590%	11.579%	13.016%	12.264%
CTI3	7	7							1	1	100.000%		100.000%	
FC1	579	89	217	45	6	0	26	2	21	2	15.371%	20.737%	15.017%	19.342%
FC2	303	25	2129	154	26	3	305	11	7	2	8.251%	7.233%	8.929%	6.779%
FC3	2	1	55	22			6	4			50.000%	40.000%	50.000%	42.623%
MA1	409	238	101	63	86	45	18	11	165	100	58.191%	62.376%	58.030%	62.185%
MA2	637	589	97	94	93	90	22	22	213	206	92.465%	96.907%	93.849%	97.479%
MA3	472	471	28	28	91	91	20	20	291	291	99.788%	100.000%	99.883%	100.000%
OS1	647	17	429	9	15	0	64	1	55	0	2.628%	2.098%	2.371%	2.028%
OS2	100	1	460	15	4	0	58	2	6	0	1.000%	3.261%	0.909%	3.282%
OS3	156	2	558	14	3	0	102	1	5	0	1.282%	2.509%	1.220%	2.273%

CYCLE 184
(SEP 2004)

	Type Duty 1		Type Duty 2		Type Duty 3		Type Duty 4		Type Duty 6		Advancement Rate			
Exam	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	Type Duty 1	Type Duty 2	Type Duties 1, 3, & 6	Type Duties 2 & 4
BM1	419	51	489	56	20	3	57	10	21	3	12.172%	11.452%	12.391%	12.088%
BM2	195	15	782	74	17	0	147	15	10	2	7.692%	9.463%	7.658%	9.580%
BM3	155	1	1082	30	7	0	216	3	3	0	0.645%	2.773%	0.606%	2.542%
CTI1	72	32	33	11	4	2	2	0	13	6	44.444%	33.333%	44.944%	31.429%
CTI2	323	51	107	25	2	0	9	4	32	7	15.789%	23.364%	16.246%	25.000%
CTI3	1	0									0.000%		0.000%	
FC1	746	53	330	24	10	2	45	5	26	1	7.105%	7.273%	7.161%	7.733%
FC2	225	13	1839	146	23	0	269	22	7	0	5.778%	7.939%	5.098%	7.970%
FC3	3	2	54	29			5	2			66.667%	53.704%	66.667%	52.542%
MA1	411	62	92	20	69	8	11	1	111	13	15.085%	21.739%	14.044%	20.388%
MA2	545	14	56	0	103	2	7	0	175	3	2.569%	0.000%	2.309%	0.000%
MA3	339	161	40	20	122	59	15	6	221	90	47.493%	50.000%	45.455%	47.273%
OS1	784	12	528	20	19	0	72	1	63	1	1.531%	3.788%	1.501%	3.500%
OS2	193	37	990	267	6	2	156	32	8	3	19.171%	26.970%	20.290%	26.091%
OS3	171	19	707	137	9	0	112	19	8	1	11.111%	19.378%	10.638%	19.048%

CYCLE 186
(JAN 2005)

	Type Duty 1		Type Duty 2		Type Duty 3		Type Duty 4		Type Duty 6		Advancement Rate			
Exam	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	Type Duty 1	Type Duty 2	Type Duties 1, 3, & 6	Type Duties 2 & 4
BMC	270	73	304	87	20	3	34	16	21	2	27.037%	28.618%	25.080%	30.473%
CTIC	145	18	56	9	1	1			31	5	12.414%	16.071%	13.559%	16.071%
FCC	426	96	397	88	7	2	45	10	16	1	22.535%	22.166%	22.049%	22.172%
MAC	578	42	188	31	72	11	38	5	133	14	7.266%	16.489%	8.557%	15.929%
OSC	415	62	464	96	13	1	57	12	26	2	14.940%	20.690%	14.317%	20.729%

CYCLE 187
(MAR 2005)

	Type Duty 1		Type Duty 2		Type Duty 3		Type Duty 4		Type Duty 6		Advancement Rate			
Exam	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	Type Duty 1	Type Duty 2	Type Duties 1, 3, & 6	Type Duties 2 & 4
BM1	456	10	417	11	34	1	58	1	25	0	2.193%	2.638%	2.136%	2.526%
BM2	182	11	779	74	17	1	130	16	7	0	6.044%	9.499%	5.825%	9.901%
BM3	111	31	889	378	5	0	169	67	3	0	27.928%	42.520%	26.050%	42.060%
CTI1	52	39	23	20	3	2	1	1	11	11	75.000%	86.957%	78.788%	87.500%
CTI2	355	152	91	51	2	1	5	4	21	14	42.817%	56.044%	44.180%	57.292%
CTI3			2	2								100.000%		100.000%
FC1	771	76	292	40	7	1	45	6	24	3	9.857%	13.699%	9.975%	13.650%
FC2	188	14	1713	130	20	1	233	22	1	0	7.447%	7.589%	7.177%	7.811%
FC3	3	1	42	16			6	3			33.333%	38.095%	33.333%	39.583%
MA1	500	70	109	20	98	14	9	3	150	38	14.000%	18.349%	16.310%	19.492%
MA2	1055	223	130	42	183	53	38	9	438	93	21.137%	32.308%	22.017%	30.357%
MA3	358	267	65	47	127	96	26	19	385	238	74.581%	72.308%	69.080%	72.527%
OS1	849	41	583	56	31	1	85	5	61	4	4.829%	9.605%	4.888%	9.132%
OS2	127	56	702	436	9	4	97	75	6	2	44.094%	62.108%	43.662%	63.955%
OS3	128	125	638	632	6	6	98	97	7	7	97.656%	99.060%	97.872%	99.049%

CYCLE 188
(SEP 2005)

	Type Duty 1		Type Duty 2		Type Duty 3		Type Duty 4		Type Duty 6		Advancement Rate			
Exam	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	Type Duty 1	Type Duty 2	Type Duties 1, 3, & 6	Type Duties 2 & 4
BM1	487	33	518	47	17	0	74	6	32	1	6.776%	9.073%	6.343%	8.953%
BM2	186	37	579	120	8	0	99	25	11	4	19.892%	20.725%	20.000%	21.386%
BM3	59	4	990	129	4	1	168	19	4	0	6.780%	13.030%	7.463%	12.781%
CTI1	43	42	22	21	1	1	4	4	9	9	97.674%	95.455%	98.113%	96.154%
CTI2	283	215	33	30	1	0			5	5	75.972%	90.909%	76.125%	90.909%
CTI3	3	3									100.000%		100.000%	
FC1	752	86	262	44	2	0	45	10	26	1	11.436%	16.794%	11.154%	17.590%
FC2	142	24	1444	211	8	0	178	26	2	0	16.901%	14.612%	15.789%	14.612%
FC3	6	5	30	21			3	1			83.333%	70.000%	83.333%	66.667%
MA1	596	44	123	13	123	7	16	0	187	21	7.383%	10.569%	7.947%	9.353%
MA2	997	141	153	41	155	21	39	5	412	77	14.142%	26.797%	15.281%	23.958%
MA3	282	195	49	35	73	44	13	10	162	122	69.149%	71.429%	69.826%	72.581%
OS1	814	63	684	66	22	2	89	11	67	3	7.740%	9.649%	7.530%	9.961%
OS2	73	44	331	254	1	1	33	30	9	8	60.274%	76.737%	63.855%	78.022%
OS3	36	15	433	310	1	0	72	61	1	1	41.667%	71.594%	42.105%	73.465%

CYCLE 190
(JAN 2006)

	Type Duty 1		Type Duty 2		Type Duty 3		Type Duty 4		Type Duty 6		Advancement Rate			
Exam	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	Type Duty 1	Type Duty 2	Type Duties 1, 3, & 6	Type Duties 2 & 4
BMC	231	79	347	124	8	2	39	11	20	7	34.199%	35.735%	33.977%	34.974%
CTIC	134	29	81	17	6	1	4	0	13	5	21.642%	20.988%	22.876%	20.000%
FCC	392	86	390	77	3	0	47	9	18	3	21.939%	19.744%	21.550%	19.680%
MAC	647	58	181	16	72	11	30	3	255	18	8.964%	8.840%	8.932%	9.005%
OSC	394	45	490	66	13	2	61	8	27	1	11.421%	13.469%	11.060%	13.430%

CYCLE 191
(MAR 2006)

	Type Duty 1		Type Duty 2		Type Duty 3		Type Duty 4		Type Duty 6		Advancement Rate			
Exam	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	Type Duty 1	Type Duty 2	Type Duties 1, 3, & 6	Type Duties 2 & 4
BM1	483	86	524	103	18	4	71	14	29	7	17.805%	19.656%	18.302%	19.664%
BM2	158	54	666	226	9	4	127	37	6	2	34.177%	33.934%	34.682%	33.165%
BM3	100	19	1185	317	10	1	239	69	6	1	19.000%	26.751%	18.103%	27.107%
CTI1	32	25	23	19	1	1	4	4	4	4	78.125%	82.609%	81.081%	85.185%
CTI2	162	64	9	3							39.506%	33.333%	39.506%	33.333%
CTI3	2	2									100.000%		100.000%	
FC1	659	114	232	46	1	1	34	5	28	0	17.299%	19.828%	16.715%	19.173%
FC2	144	35	1184	281	2	0	160	42	1	0	24.306%	23.733%	23.810%	24.033%
FC3	3	3	18	18			2	2			100.000%	100.000%	100.000%	100.000%
MA1	633	19	168	4	120	3	25	0	213	5	3.002%	2.381%	2.795%	2.073%
MA2	1040	24	251	10	221	4	66	4	522	10	2.308%	3.984%	2.131%	4.416%
MA3	255	42	45	11	57	10	17	6	108	19	16.471%	24.444%	16.905%	27.419%
OS1	767	42	613	35	19	2	93	9	61	3	5.476%	5.710%	5.549%	6.232%
OS2	88	37	621	326	6	4	94	55	8	6	42.045%	52.496%	46.078%	53.287%
OS3	38	38	358	354	2	2	54	53	1	1	100.000%	98.883%	100.000%	98.786%

CYCLE 192
(SEP 2006)

	Type Duty 1		Type Duty 2		Type Duty 3		Type Duty 4		Type Duty 6		Advancement Rate			
Exam	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	# Examined	# Advanced	Type Duty 1	Type Duty 2	Type Duties 1, 3, & 6	Type Duties 2 & 4
BM1	457	23	507	43	20	0	55	4	28	3	5.033%	8.481%	5.149%	8.363%
BM2	105	26	490	149	8	4	71	17	13	6	24.762%	30.408%	28.571%	29.590%
BM3	59	13	1001	394	4	2	183	65	2	0	22.034%	39.361%	23.077%	38.767%
CTI1	42	36	25	22	1	1	6	6	2	2	85.714%	88.000%	86.667%	90.323%
CTI2	185	72	4	1					1	0	38.919%	25.000%	38.710%	25.000%
CTI3														
FC1	505	105	246	80			40	20	20	10	20.792%	32.520%	21.905%	34.965%
FC2	113	28	963	383	4	3	108	42	6	1	24.779%	39.772%	26.016%	39.683%
FC3	1	1	18	18							100.000%	100.000%	100.000%	100.000%
MA1	729	11	192	2	117	3	40	0	240	12	1.509%	1.042%	2.394%	0.862%
MA2	1069	56	288	19	234	17	80	8	535	28	5.239%	6.597%	5.495%	7.337%
MA3	393	276	63	50	49	34	29	18	157	127	70.229%	79.365%	72.955%	73.913%
OS1	804	29	714	36	23	0	91	4	62	2	3.607%	5.042%	3.487%	4.969%
OS2	63	29	551	306	3	1	82	50	3	0	46.032%	55.535%	43.478%	56.240%
OS3	31	30	342	340	1	1	35	35	1	1	96.774%	99.415%	96.970%	99.469%

4. Advancement Differential Cost Data (in Current Year Dollars)

Jul-01

		Years of Service										
Promotion to		2	3	4	6	8	10	12	14	16	18	Expected Value of Advancement
E4	Differential	$116.70	$117.00	$190.80								$144.63
	Probability	0.15	0.475	0.375								
E5	Differential		$123.30	$124.80	$126.30							$124.95
	Probability		0.2	0.5	0.3							
E6	Differential			$193.50	$190.80	$190.50	$208.80	$211.20	$208.50			$200.19
	Probability			0.05	0.15	0.3	0.3	0.15	0.05			
E7	Differential				$258.30	$264.90	$263.70	$264.00	$263.10	$286.50	$320.70	$268.65
	Probability				0.05	0.1	0.2	0.3	0.2	0.1	0.05	

Jan-02

		Years of Service										
Promotion to		2	3	4	6	8	10	12	14	16	18	Expected Value of Advancement
E4	Differential	$132.30	$131.10									$131.28
	Probability	0.15	0.85									
E5	Differential		$146.10	$148.20	$160.50							$151.47
	Probability		0.2	0.5	0.3							
E6	Differential			$205.20	$204.60	$224.40	$227.10	$224.10				$221.22
	Probability			0.05	0.15	0.3	0.3	0.2				
E7	Differential				$300.00	$308.40	$307.80	$309.00	$308.70	$334.50	$372.30	$313.91
	Probability				0.05	0.1	0.2	0.3	0.2	0.1	0.05	

Jan-03

		Years of Service										
Promotion to		2	3	4	6	8	10	12	14	16	18	Expected Value of Advancement
E4	Differential	$137.70	$136.50	$220.50	$295.20							$170.05
	Probability	0.15	0.475	0.35	0.025							
E5	Differential		$152.10	$154.20	$213.00							$171.42
	Probability		0.2	0.5	0.3							
E6	Differential			$213.60	$167.10	$249.00	$240.60	$279.00	$353.40			$242.15
	Probability			0.05	0.15	0.3	0.3	0.15	0.05			
E7	Differential				$312.30	$267.00	$276.00	$276.00	$353.70	$403.20	$429.00	$312.83
	Probability				0.05	0.1	0.2	0.3	0.2	0.1	0.05	

Jan-04

		Years of Service										
Promotion to		2	3	4	6	8	10	12	14	16	18	Expected Value of Advancement
E4	Differential	$142.80	$141.30	$228.60								$174.26
	Probability	0.15	0.475	0.375								
E5	Differential		$174.30	$177.00	$239.10							$195.09
	Probability		0.2	0.5	0.3							
E6	Differential			$227.70	$179.40	$265.20	$256.50	$317.40	$395.40			$262.19
	Probability			0.05	0.15	0.3	0.3	0.15	0.05			
E7	Differential				$332.10	$285.30	$294.90	$294.90	$376.50	$428.70	$485.70	$335.04
	Probability				0.05	0.1	0.2	0.3	0.2	0.1	0.05	

Jan-05

		Years of Service										
Promotion to		2	3	4	6	8	10	12	14	16	18	Expected Value of Advancement
E4	Differential	$147.90	$146.10	$236.70								$180.35
	Probability	0.15	0.475	0.375								
E5	Differential		$180.60	$183.00	$247.50							$201.87
	Probability		0.2	0.5	0.3							
E6	Differential			$235.80	$185.70	$274.50	$265.50	$328.50	$409.20			$271.38
	Probability			0.05	0.15	0.3	0.3	0.15	0.05			
E7	Differential				$343.50	$295.20	$305.10	$305.40	$389.70	$444.70	$502.50	$346.87
	Probability				0.05	0.1	0.2	0.3	0.2	0.1	0.05	

Jan-06

		Years of Service										
Promotion to		2	3	4	6	8	10	12	14	16	18	Expected Value of Advancement
E4	Differential	$152.40	$150.60	$243.90								$185.86
	Probability	0.15	0.475	0.375								
E5	Differential		$186.00	$188.70	$255.30							$208.14
	Probability		0.2	0.5	0.3							
E6	Differential			$243.00	$191.40	$282.90	$273.90	$338.70	$422.10			$279.81
	Probability			0.05	0.15	0.3	0.3	0.15	0.05			
E7	Differential				$354.30	$304.50	$314.40	$315.00	$401.70	$457.50	$517.80	$357.53
	Probability				0.05	0.1	0.2	0.3	0.2	0.1	0.05	

5. Advancement Cost

		Advancement Cost ($2006)				
Fiscal Year	Rating	BM	FC	OS	CTI	MA
2002	[redacted]	2,577,198	1,150,828	3,823,903	114,804	452,736
2003	[redacted]	3,487,777	1,388,399	4,394,743	173,275	634,397
2004	[redacted]	2,760,980	1,240,933	4,122,225	203,319	708,683
2005	[redacted]	1,516,184	1,188,349	3,063,760	254,888	428,074
2006	[redacted]	2,211,666	1,579,615	3,010,540	249,858	356,410

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